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ILLINOIS MEDICAL JOURNAL

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Original Articles

SOME OBJECTIONS TO HEALTH INSURANCE LEGISLATION.*

EDWARD H. OCHSNER, B. S., M. D.,

CHICAGO.

That the economic condition of the average married laboring man who lives in a large industrial center is extremely precarious because of ill health and unemployment, is a well established fact. That some form of relief for this condition is desirable is equally evident. That the various forms of relief such as commercial insurance, sick benefits, organized charities, etc., have proven inadequate and unsatisfactory and that sooner or later some attempt will be made to secure State Health Insurance is equally evident.

In considering laws for the regulation and the relief of such conditions a number of important points must be kept in mind. Such laws should provide for the greatest good for the greatest number and they should do this without injury to any large class engaged in a legitimate business or profession. Every care must be taken that the laws do not introduce new evils greater than the ones they are intended to remedy.

In considering new and untired legislation it is not sufficient to convince oneself that such legislation would be advisable from an idealistic and theoretical standpoint; it is even more necessary to determine definitely that the proposed laws cannot be abused to such an extent as to make the abuse worse than the difficulties which are to be overcome. In this connection it may be interesting to some of you to know that in some parts of the State of Illinois the Mother's Pension Act is already shamefully abused. As a result of this mal-administration, the State of Illinois, in some of its counties, at least, is now engaged in subsidizing the breeding of defectives and criminals. To be sure this is as yet indulged in only to a very limited extent, but there is no telling how far this may develop as time goes on. The Mother's Pension Act specifically provides that only good moral women are eligible for the pension, and yet our inspector has found a number of cases where women who are not even married are getting a pension for one or two children. In one instance a woman who has six illegitimate children is drawing pensions for two of them and at the same time living with a gentleman friend who is not her husband.

State health insurance would probably affect the medical profession more than any other, and consequently special care must be taken not to injure the standards of this profession nor to lower the quality of medical service. The health, happiness, prosperity and efficiency of the citizenship of any nation depends more upon the integrity and ability of the medical profession and upon the quality of medical service rendered to its people than upon any one other factor, and any legislation which is inimical to medical progress will eventually react unfavorably upon the whole nation. In drafting health insurance laws, it is very important to avoid certain dangers and to not repeat the mistakes that have been made in charity medical practice, in dispensary practice and in contract practice. A common mistake in all of these forms of practice has been the insufficient remuneration of the physicians engaged in it. Good efficient service can only be secured if the remuneration is adequate. Another serious difficulty is, that medical services rendered without direct pay from the recipient is scarcely ever appreciated at its full value or followed with the same scrupulous care as is medical advice which is paid for directly by the recipient.

In contract practice there is still another serious difficulty. In practically every case which

*Read before North Side Branch of Chicago Medical Society, Jan. 12, 1917.

I have investigated, the clientele of the contract practitioner will call upon the physician on the slightest pretext, resulting in a great many unnecessary calls. If the physician's time and energy are dissipated on non-essentials it goes without saying that he will not have sufficient time and energy left for the essentials and almost without exception his interest lags and the quality of his service deteriorates greatly. These objections are not only theoretical, but they are borne out by the experience of all those engaged in dispensary, charity, medical and contract practice all over this country as well as health insurance practice in Germany.

There may be cases where contract practice is satisfactory, but they certainly are in the very great minority. Most of the thoroughly competent medical men with whom I am acquainted and who have been in contract practice have gotten out of it just as soon as they were able, because they have felt that they were not giving the best service of which they were capable.

That people who have free medical service are constantly unnecessarily running to the physician, is borne out by every contract practitioner with whom I have ever spoken and is one of the principle reasons why so many competent medical men leave contract practice. Besides it is borne out by the following very interesting experience.

One of the State universities of the central West established free medical care for its students some years ago. In a recent statement, the clinical department of this university reported that in a period of sixteen weeks it answered calls and made examinations to the number of 17,000 on a student population of about four thousand. In other words, every student in that institution on an average called upon the department a little oftener than once a month. When we consider that this occurred among students between the ages of 17 and 24, who ordinarily are in the best of health and who should require very little medical attention, we will realize to what abuses free treatment is apt to be put. At the above rate a panel physician with 500 families with an average of four members to each family would be required to make over 24,000 calls a year or about 65 calls per day, including Sundays and holidays. When we consider that little children, women during the child-bearing period, men in hazardous occupations and the aged need more medical attention than college students between the ages of 17 and 24, it becomes evident that the number of calls a panel physician would be called upon to make would be considerably in excess of the figures above given.

Health insurance practice in Germany has encountered the same difficulties and engendered the same abuses. I was told by health insurance physicians in Berlin that more than half of the calls which they were required to make were entirely unnecessary and would not have come in at all had the recipient been required to pay for the calls out of his own pocket.

I know of one physician, in a city in this State, who is the physician for a number of benefit organizations, who prides himself on making from forty to sixty family visits a day, besides doing some surgery and maintaining an office hour. Instead of priding himself on this accomplishment, he should be ashamed to admit it to himself, even in the dark. A patient recently described one of his visits, thus; The doctor rushed into the room; threw off his coat and sat down; asked the patient how he was feeling; before the patient had time to answer, wrote out a prescription, and rushed out of the house. Such medical service is worse than no medical service at all and is the kind of a thing that discredits medicine in the eyes of the thinking public.

It is stated that in some communities forty per cent. of the inhabitants never call in medical aid. While this is certainly undesirable, I would rather have sixty per cent. of the population have fairly efficient medical aid and the other forty per cent. have none at all, than to have, say, thirty per cent. have efficient medical aid and the other seventy per cent. have the kind of medical service just described. In the former case at least those who have intelligence enough to employ physicians will have fairly good ones, while in the latter event a very large per cent. of the citizenship will have poor medical service from no fault of their own.

In health insurance another very serious difficulty comes in, namely, the tendency of patients to malinger. Patients actually do fain sickness in large numbers when no real sickness exists.

This gives the physician a great deal of extra work, and consequently throws a great burden upon the honest members of the community who are insured in the same class. In this way there is considerable danger of making the thrifty, industrious, honest workman pay tribute to the shiftless and dishonest—a tendency which is already only too often encouraged by various remedial forms of legislation.

A mild form of malingering or deception which, however, in its totality, amounts to a good deal and has a tendency to seriously corrupt medical men, is the very attempt on the part of the insured to get a little more sick benefit than he is honestly entitled to. This tendency makes itself felt in the Workman's Compensation Act, but here the matter is somewhat equalized by the physician of the insured on one side and the physician for the insurance company on the other side. In health insurance, particularly if the insurance were State insurance, this check would be less effective because we all know how few people have conscientious scruples in robbing the State, and how unprofitable it is for any State official to attempt to prevent this exploitation. The result would be that the honest, conscientious worker, who will not stoop to unfair means in securing sick benefit, will be exploited to the benefit of the unscrupulous worker and the effect upon the medical practice will be even still more baneful because the insured will be very likely to choose the "easy" doctor—the one who will be inclined to stand for large sick benefits. The ultimate danger to scientific medicine can easily be foreseen, for even medical men must live and the conscientious medical man, when he sees his practice slip away to his "easy" competitor, will be compelled to ease up a little—to make out health certificates for longer periods than he thinks fair and just.

In this connection, let us also call attention to the fact, that the lazy, shiftless workman, who works only two weeks in the month, will pay only one-half as much towards the insurance fund as the workman who works faithfully every day, and yet the former will, if anything, be likely to receive more benefit.

We are suffering from one of the severest epidemics that has ever afflicted this country—an epidemic which has spread over the land like wild fire, and seems to be at its height just now, and which might be termed "An Itching Palm for Easy Money." It is surprising how many people have become afflicted and how many are perfectly willing to eat the fruit when the other fellow has planted, nursed and tended the tree. It is high time that we considered first in our legislation the hardworking, conscientious members of our community and make "easy money" more difficult.

Contrary to the opinion generally expressed in these discussions, I believe that only those who would derive benefit from such health insurance should be taxed to maintain the system. It is claimed by some that such a system of health insurance cannot be maintained unless the State carry a portion of the burden. Personally, I do not think it would be fair to tax small tradesmen and shopkeepers or the farmer, particularly the renter, to support such a system unless they were included in it. The small tradesman and shopkeeper is already finding it very difficult to make a decent living and finds it practically impossible to acquire even a moderate competence for old age because of the crushing competition of mail order houses, large corporations, etc., even going without medical care for himself and family because he cannot afford it. Under these conditions, it certainly would be unfair to ask him to contribute to the medical care of others. The average farmer and farmer's wife, particularly the tenant, are the hardest worked citizens of the State, who also often go without medical aid because they cannot afford it, and unless they are included in the system, should not be asked to bear a portion of the burden. For these reasons, I believe, that if health insurance is established all the expense with the possible exception of State supervision should be borne by the insured and the employer.

In this country, at least, we suffer from still another serious difficulty and that is notoriously inefficient, more or less corrupt administration of government. It is a very serious question in my mind whether we have progressed far enough in civilization, far enough in administration of our government to make it safe for us to venture into this new field. Until we have devised means to eliminate spoils politics, favoritism, pull, nepotism and graft, it is a very great question whether health insurance will accomplish more good than harm in the end.

Let us go slow in this State, where the problems of government are so complicated because of the dual needs of the large rural districts and the large industrial centers, and let some State where the conditions are less complicated try out health insurance first. I am convinced that if a health insurance law were passed it would be very difficult to repeal it even if it be found after a time to result in favoritism and unfairness. Take as an illustration our pension systems in Chicago. A recent investigation by competent actuaries has demonstrated, we are told, that the Firemen's Pension Fund, the Police Pension Fund and even the Teacher's Pension Fund are hopelessly insolvent; that if a private insurance company were in such straits a receiver would be demanded for it immediately—and yet these funds are permitted to go on with the prospect of their getting into deeper and deeper water all the time.

Those best informed assure us that national prohibition will be an accomplished fact within five years and again those best informed assure us that liquor is the greatest factor in the production of poverty and that national prohibition will prevent poverty to a large degree. Would it not be best to ascertain first whether these two statements are true before we launch into health insurance?

The question naturally arises, who is going to administer health legislation, and have we now, or are we likely to secure suitable machinery for its administration? Shall it be the State, the city or the county? And have any, or all, of these political subdivisions so conducted themselves—say, during the past twenty-five years—as to make us willing to entrust this additional work to them? I have been a resident and citizen of Chicago for something over twenty-five years and have watched things rather closely, and am free to express the opinion that inefficiency and mismanagement have been the rule rather than the exception. It is true that there have been a number of notable exceptions of splendid business administrations, and yet who will deny that if any business concern had been as poorly managed as Cook county and Chicago have been in the past twenty-five years, it would have become bankrupt?

Just look back at the disgraceful management of Dunning, while under the care of the County, and, what could one expect of a Board consisting of fifteen members who change every two years, most of whom have no qualifications for the position, except that they can obtain a few more votes than someone else. Look at our own city. It is reported in the daily press, that during the past year eleven real estate experts received $130,000 for part time service appraising real estate. I am sure we would all like nice fat jobs at $10,000 per year spending two or three hours a day giving our opinion on medical subjects of various kinds, but there are two serious difficulties in the way. First, there would not be enough money to go around for all of us and, second, not those best qualified, but those who have the most political pull would be almost sure to secure the most desirable positions.

Much of the confusion which exists on this subject, even in the minds of medical men today, is there because we have not kept clearly in mind the great inherent difference between preventive medicine on the one side and the care of the sick on the other side. Preventive medicine should, in the main, be a government function, because organized society, as expressed in government alone, can adequately handle this phase of the medical problem. Preventive medicine is peculiarly suited to government control while the care of the sick is utterly unsuited to it. The treatment of a sick person is a very personal matter and does not lend itself to wholesale impersonal methods.

The above statement is borne out by the history of medicine in this country during the last twenty-five years. Federal and State medicine, as exemplified in the Marine Hospital Service, the Army and Navy Medical Service and State Charitable Institutions, have done splendid service in preventive medicine. I need but mention the service rendered to the nation and the world by Reed in his discovery of the mode of transmission of yellow fever and the work done by others in bubonic plague, hookworm, the prevention of malaria and typhoid fever, etc. Federal and State medicine, to the contrary, have added relatively little to the methods of treating disease. I can emphasize this last statement best by saying that in my opinion these government departments have taught us less about the cure of disease and the healing of the sick than has either the Murphy clinic, the Mayo clinic, or my brother's clinic, or Dr. Pettit's Ottawa Tuberculosis Colony, or a number of

others which might be mentioned, any one of which has done more along this line than all of the agencies combined. When you consider the number of agencies and the number of patients under their control, it ought to convince us that if government controlled medicine is extended beyond its present confines, it is going to retard rather than accelerate medical progress on the side of curative medicine. The fact is that except in laboratory research work, where it cannot do so much harm, government regulation and red tape hampers the clinician to such a degree that he cannot do his best.

The successful practice of medicine depends fully as much upon the personal human sympathy which exists between the physician and his patient as upon the scientific problems involved, and if you take away the former and commercialize and wholesalize the practice of medicine you will alienate from it a large proportion of the big whole-souled human men who have made medicine what it is today.

Those who are so strongly in favor of health insurance legislation seem to be laboring under still another misapprehension. They seem to think that health insurance will either prevent poverty or cure the evils resulting from poverty. I feel, however, that it will do neither, that, in fact, health insurance would be only a palliative and like most palliatives, if persistently employed, will do more harm than good.

The present agitation for health insurance reminds me very forcibly of the medical experience with the hypodermic use of morphin and cocaine. Some thirty or forty years ago, when the hypodermic needle was first invented, many laymen and even some physicians were very enthusiastic about it and felt that now a remedy for the banishment of all pain from the world had been discovered. Gallstones, for instance, had lost their terror temporarily because a simple little injection would almost instantly still the pain. It took even physicians some time to realize that morphin was only a palliative and if persisted in the patient was actually made worse instead of better. In order to cure the patient much more heroic means must be resorted to—the gall stones must actually be removed with the knife.

While pain and poverty will never be banished from the world, pain has already been greatly alleviated because medicine has largely substituted prevention and cure for palliation. Are we going to make the same mistake in attempting to relieve poverty that we made in attempting to relieve pain? I hope not. I hope instead we will try to strike at the root of the evil, to prevent most of it, to cure a large per cent of the remainder and to palliate only that which cannot be prevented or cured.

Pull, favoritism, spoils politics, nepotism, graft and parasitism are in the last analysis the factors that have been the ruination of more nations than all other causes combined, and I feel that until radical changes have been made in our administrative system, health insurance might be used by the spoils politician, the grafter and the parasite as a means by which to fasten themselves upon the back of the honest citizen of the State even more firmly than they are able to under the present conditions.

Let us cut out of the body politic the above baneful influences; above all, let us attempt to exterminate all human parasites who are sucking the life blood of our nation. If we can succeed in doing this, if we can make every citizen do his fair share of the country's labor, poverty will, in a large measure, be prevented and Health Insurance Legislation will be unnecessary.

2155 Cleveland Ave.

SOME INTERESTING LABORATORY INVESTIGATIONS IN TUBERCULOSIS.*

H. J. CORPER, M. D.,
Municipal Tuberculosis Sanitarium of the City of Chicago.

CHICAGO.

In presenting this paper today, dealing with what would appear at first inspection to be the preliminary presentation of problems without any relation to or bearing upon each other, it seems advisable to point out the purpose of these investigations and the ultimate goal that is being sought by their performance. As is well known, tuberculosis, in as far as a specific therapy is concerned, is still to be looked upon as in the dark ages; no empirical medicinal treatment has ever been found or developed as in the case of syphilis with its mercury and malaria with its quinine. To those of us who have attempted to grow the

*Read before the Robert Koch Society, Oct. 26, 1916.

tubercle bacillus it is easily appreciated what a saint's patience is required to work in this field. When we consider that it requires from two to six weeks for the organism to begin to grow or to produce disease in an animal as compared to the one and two-day growth of the pneumococcus and pus-forming organisms, the trials and tribulations of the investigator are appreciated. It is for this reason that even though the word therapy to the average mind conveys a simple thought, it is not to be applied in the simple sense to the working out of a therapy for tuberculosis. The proving of a therapy becomes more complicated the further we stray from a *specific magna sterilisans*, yet this is not the only therapy that can be considered by the investigator in this field as is attested to by our modern sanitarium methods of treating the great white plague, and also the use of artificial pneumothorax in this disease. Any adjuncts to our present-day methods that can be proved of value to shorten the duration of the disease must be considered as a therapy. Now, how can these improvements be developed? Only by an intelligent understanding of the organism causing the disease and of the host afflicted with the disease.

Let us consider now what can be included in a classification of a therapy for tuberculosis. In the first place, we may divide the therapeutic agents for tuberculosis into those that are intended to act upon the tubercle bacilli themselves —a direct therapy—and those that are to influence the disease by their action upon the host and thus indirectly upon the tubercle bacillus—an indirect therapy. Among the direct therapeutic agents we can expect a drug that will, when introduced into the body, kill the tubercle bacillus harbored there and thus produce a magna sterilisans in the Ehrlich sense, or we can expect a drug that will, when introduced into the body and kept there for a definite period of time, inhibit the growth of the tubercle bacillus for the time during which the drug persists in the body. It is needless to say that the time element of administration of the drug is an important factor in the consideration of any therapeutic agents. In previous investigations carried out by Wells, DeWitt, the author and a number of colleagues on the chemotherapy of tuberculosis, a number of interesting and enlightening facts were ascertained with regard to the direct therapeutic agents. For instance, it was found that simple crystalloids like potassium iodide,[1] sodium sulphocyanate,[2] sodium arsenite,[3] sodium cacodylate, etc., when introduced into the animal organism, were able to penetrate the tubercle and thus reach the tubercle bacilli within a short period of time after introduction and in concentrations closely approaching that attainable in the blood, while colloids like egg albumin and colloidal copper[4] could not enter to any appreciable extent. The compounds, i. e., copper salts and the salts of the heavy metals that formed colloidal combinations when introduced into the body also could not penetrate the tubercle and thus reach the tubercle bacilli either to kill them or inhibit their growth. Thus it is easily seen that there are some drugs that are not even applicable or to be considered as direct therapeutic agents for tuberculosis.

In this earlier work it was also noted that certain drugs, notably the selenites and tellurites,[5] could not be considered available (contrary to the predictions and expectations of an Italian investigator, Belfanti) since even though crystalloids in themselves, they were almost immediately reduced to an inactive form by the tissues of the body at the site of injection.

In carrying out investigations with organic compounds still unpublished the speaker, in conjunction with Mr. H. Nyvall, discovered another interesting fact that acted as a bar to the use of certain of these compounds. It is a known physiological fact that when certain compounds are introduced into the animal economy they are within a short period of time conjugated with other radicals and thus we are dealing, not with the original compound introduced, but with an entirely different conjugated compound or a mixture of the former and the latter. This was found to be the case with the benzoates and salicylates tried, the resultant conjugate being much less efficient in action toward the tubercle bacillus than the original salts introduced. In earlier experiments it was considered sufficient by us to analyze for the drug introduced and then draw conclusions on the basis of these analyses as to the efficiency of this drug, but the above investigations led to the development of a supplemental method

1. Wells, H. Gideon, and Hedenburg, O. F.: Jour. Infect. Dis., 1913, II, 349-72.
2. Corper, Harry J.: Ibid, 1915, XVI, 38-46.
3. Arkin, Aaron, and Corper, Harry J.: Ibid, 1916, XVIII, 335-48.
4. Corper, Harry J.: Ibid, 1914, XV, 487-500.
5. Corper, Harry J.: Ibid, 1915, XVI, 47-58.

in which we test directly whether the drug, as it exists in the tissue and tubercle, is capable of killing or inhibiting the development of the tubercle bacillus.

In co-operation with Dr. Gekler, Mr. Sweany and Mr. Kallen, a number of quinolines,* were studied in the Municipal Tuberculosis Sanitarium laboratory for their chemotherapeutic value, paying especial attention to carbostyril on account of its high tuberculocidal and inhibitory action and low lethal dose to the host, but here again we were confronted with an important fact; the rapid, amost instant, destruction of the drug upon introduction into the body by the tissues of almost all the organs, removing it from consideration as a direct therapeutic agent.

Thus it will be seen from the foregoing facts that the proof of the value of a direct chemotherapeutic agent in tuberculosis is beset with many difficulties and discouragements. Of the number of so-called direct treatments which have been recommended for tuberculosis none have stood the test of time and these recommendations could easily have been forestalled by proper and intelligent laboratory tests.

Let us now digress for a moment and consider some interesting facts about the tubercle bacillus itself before we take up the consideration of the indirect chemotherapeutic agents. In order to gain a more intelligent insight into the organism we are trying to destroy, it was deemed advisable to study the enzymes present in this organism, since these interesting catalytic substances are also capable of destroying certain organic drugs which might be tested for therapeutic efficiency. An example of this was noted in the above cited case with carbostyril. Until within recent years the tubercle bacillus was considered lacking in these enzymes, but as improvements and refinements in methods are developed this small organism is found to possess many of them, but lacks others. In earlier experiments Dr. Wells and the author[6] had demonstrated a lipase in the tubercle bacillus capable of splitting fats and this was corroborated by Dr. Kendall and his colleagues[7],[8] who also suggested that tubercle bacilli autolyze, but did not directly demonstrate autolytic enzymes.

In co-operation with Mr. Sweany we have recently found the tubercle bacillus to possess autolytic enzymes, trypsin-like, pepsin-like, and erepsin-like enzymes similar to those found in the human stomach and intestines, but they possessed no enzymes capable of digesting starch or cane sugar.

While the tubercle bacillus is being considered, another important factor that is being investigated at the sanitarium might be mentioned in a preliminary way, however, since it is of tremendous importance and erroneous conclusions hastily drawn are not advisable. It is a known fact, observed many times, that tubercle bacilli grown artificially in the incubator eventually, after years, become practically avirulent so that tremendous doses of this avirulent organism will only produce a local tubercle without ever producing systemic disease in so susceptible an animal as the guinea pig. It is also known that there are tuberculous individuals who have suffered from open and active tuberculosis for many years, expectorating innumerable bacilli in this time. Are some of these individuals carriers of virulent bacilli and others carriers of avirulent or harmless bacilli as is the case in other diseases (diphtheria, etc.)? Gregg and Gilbert,[9] in a brief report before the second annual meeting of the National Association of Immunologists at Washington, D. C., in 1915, stated that there was a difference. These authors were kind enough to send me their original manuscript in which they reported on six cultures freshly isolated from the sputum by the recent Petroff method. Their method of determining the dose given consisted of counting the bacilli by the well-known Barker method and injecting 10, 30, 60 and 100 bacilli. The range of minimum lethal number of bacilli, that is, the number necessary for causing generalized infection of guinea pigs, was considered on this basis. In no case did 100 bacilli fail to infect while the minimum lethal range lay between 10 and 100 bacilli. Our own method of investigation consisted in the dilution method which was not open to the criticism of exposing the individual bacilli to the action of light as occurred in the Barber counting method and because for practical purposes we are drawing very

*We wish here to express our kind appreciation to Prof. M. J. Bogert of Columbia University and the Eli Lilly Co. for supplying us with some of these compounds which could not be bought.

6. Wells, H. Gideon, and Corper, Harry J.: Jour. Infect. Dis., 1912, Vol. XI, 388-96.

7. Kendall, A. I., Day, A. A., and Walker, A. W.: Ibid, 1914, XV, 432-438 and 451-64.

8. Same Authors: Ibid, 1914, XV, 483.

9. Gilbert, George Burton, and Gregg, Harold: Medical Record, LXXXVIII, 208.

fine points when we begin to count the individual bacilli. If, for instance, a few years cultivation in the incubator is capable of making a formerly virulent culture absolutely avirulent, as far as systemic production of disease in the guinea pig is concerned, we should expect, at least, some greater differences between the bacilli found in a rapidly progressive case of tuberculosis and a chronic fibroid who has had the disease for a number of years. The study of about 20 cultures isolated from cases of various types and in various stages of tuberculosis by Mr. Kallen and the author revealed that for practical purposes no avirulent human tubercle bacilli were found in the freshly cultivated sputum—1/100,000 of a milligram of the young bacilli about 3 to 6 weeks old, grown on Petroff's media and inoculated from the primary culture always produced systemic tuberculosis in guinea pigs within six weeks in contradistinction to the absence of systemic disease after the injection of 20 milligrams of the old strain of human tubercle bacilli of about five years artificial cultivation on glycerine agar in the incubator.

Absolute conclusions are as yet not justified on the basis of so few observations, since the cultures from 20 cases are a mere beginning. If, however, these experiments are borne out by further work they will guide us greatly in properly considering preventive and therapeutic measures in tuberculosis.

Now let us return to the consideration of the indirect chemotherapeutic agents for tuberculosis. As one example of the harm that can be done by applying a therapeutic agent in tuberculosis about which little is known it seems justified to cite some recent observations made upon the effect of the x-rays in tuberculosis. This agent, which has no action upon the tubercle bacilli, has been recommended a number of times for this purpose and now, thanks to laboratory investigators, has been proven to have a detrimental indirect action. Drs. Murphy and Ellis[10] have shown that white mice, which have been exposed to x-rays, are made markedly more susceptible to bovine tuberculosis than normal animals, and Dr. Morton[11] of Boston has shown that the development of tuberculosis by human bacilli in guinea pigs can be reduced from 5 to 7 weeks to 8 to 10 days by means of x-ray exposure. Benzol would probably act in a similar way, although, to my knowledge, this has not been investigated. In order to study the indirect action of drugs on tuberculosis, it is, of course, easily seen that certain standards are necessary. It is conceivable that a drug may have a direct action upon the tubercle bacillus, for instance, inhibiting its development, and still have a detrimental effect upon the body, expressing itself in its action upon the tubercle. It is a known clinical fact that potasium iodide tends to hasten the breaking down of tubercles, yet Hirsch[12] was unable to corroborate the findings of Cantacuzene in this line in experimental animals. Here again we face not a simple problem, but a problem with at least two phases which are directly applicable to human tuberculosis. The initial tubercle differs in many respects from the second tubercle formed at a later period by the inoculation of tubercle bacilli. Thus was early noted by Koch[13] that, "If a normal guinea pig is inoculated with tubercle bacilli, the point of inoculation very soon closes. After 10 to 14 days there appears at this site a small hard nodule which finally ulcerates. This shows no tendency to heal and remains so until the death of the animal. If, however, an already tuberculous guinea pig is similarly inoculated, while the point of inoculation also closes, no indurated nodule appears. Instead, a necrotic process of the skin sets in after the second day, which finally terminates in the casting off of the slough and the formation of a flat ulceration that heals rapidly." Koch also noted that dead tubercle bacilli can produce tubercles identical with the living bacilli except that they form no metastases.

Vaughn[14] explains this changed reaction to the second inoculation by the increased presence of a lytic agent in the tuberculous animals which is capable of forming the toxic products from the bacilli. If, therefore, a therapeutic agent is to be considered for its action upon the tubercle, these two phases of the tubercle formation deserve consideration, the former being more like that found in children, while the latter would simulate that found in the adult. Since dead tubercle bacilli can not multiply and still possess

10. Murphy, James B., and Ellis, A. W. M.: Jour. Exp. Med. 1914, XX, 397.
11. Morton, John J.: Ibid, 1916, XXIV, 419-27.
12. Hirsch, Edwin Frederick: Jour. Infect. Dis., 1914, XV, 487-500.
13. Koch, Robert: Gesammelte Werke, I.
14. Vaughn, Victor C.: Protein Split Products in Relation to Immunity and Disease, 1913.

all the powers of forming tubercles without the uncertain elements involved in using living bacilli, definite known amounts of dead tubercle bacilli were injected intracutaneously into the abdomen of guinea pigs where they could be frequently observed and studied, and found to always produce definite sized tubercles which, in the majority of cases, did not rupture, but gradually disappeared. If, however, guinea pigs were likewise intracutaneously injected with the same amount of dead bacilli after previous inoculations of about 2 to 3 weeks with dead or living bacilli, these tubercles would rupture anywhere within from 5 to 10 days, leaving a small ulcer which would gradually heal. In an animal in a poor state of nourishment the time required for rupture would be increased markedly. Splenic tissue and aleuronat resembled tubercle bacilli in rupturing after previous injection of the homologous substance, but edestin and coagulated egg white did not reveal this reaction. These preliminary standardizing experiments have been carried out in the sanitarium laboratories and will now be applied to the study of the effect of therapeutic agents upon the tubercle, a study which heretofore proved very unsatisfactory.

It is generally conceded that the breaking down of the tubercle leads to the dissemination of the disease, and if such occurs into a blood vessel may lead to a miliary tuberculosis which, of course, we all know is to be avoided if possible. This brings into consideration another method of applying an indirect therapeutic agent. The excellent studies of Jobling and Peterson[15],[16],[17] have awakened us to the tremendous importance of the ferments and antiferments of the animal body in hastening or preventing the dissolution of the dead tissues. The split products of the tissues are dangerous to the organism. Jobling and Peterson found that certain unsaturated fatty radicles have a powerful anti-fermentative action. Is it not possible that the rationale of the old cod liver oil treatment, which was given on an empirical basis, acted mainly upon the ferments and is it not also possible that we so zealously watch the weight of our patients for the same reason? In preliminary experiments in which we tried to set some definite standards for the purpose of studying the effects of drugs upon the ferments and anti-ferments of the tubercle we unfortunately, after a great deal of work, found that the method used was not sufficiently accurate for this purpose.

It is well-known that as an indirect therapeutic measure artificial pneumothorax in selected cases of phthisis is of tremendous value in decreasing the spread of the lesion in the involved lung, in stopping hemorrhage in cavity cases and collapsing these cavities, and indirectly preventing absorption of toxic material, thus affording a better opportunity for recovering the lost resistance occasioned by the prolonged duration of the disease and frequently swaying the pendulum on the side of complete recovery. With these facts in mind it was thought advisable to consider the value of artificial pneumoperitoneum upon tuberculous peritonitis. It is conceded among surgeons that the mere opening of the abdomen in a case of tuberculous peritonitis frequently has a favorable action upon the progress of the disease and often recoveries are secured. The *modus operandi* of this has been explained in a number of ways; i. e., stimulating the flow of lymph, the formation of antibodies, the presence of the light, etc. On the basis of this fact a number of investigators have tried the injection of air and nitrogen, thus producing an artificial pneumoperitoneum and, though reporting on isolated cases, have seen favorable results.

For instance Brückner[18] suggests that the gas acts beneficially by preventing adhesions by keeping the peritoneal surfaces apart, aids absorption in cases of ascites, and stimulates the formation of antibodies.

In view of these favorable results reported it was thought advisable to study the subject in experimental animals where conditions could be better controlled. This work, which was carried on by Dr. R. G. Peschman and myself in rats, resulted in the following findings: In order to gauge the length of time of persistence of the air in the peritoneal cavity the absorption was controlled by the use of the x-ray. That constant conditions might be present in all cases, dead tubercle bacilli were used so that the uncertain growth factor would not conflict with the results. Even after prolonged presence of air introduced by frequent injections into the peritoneal cavity there was noted no decrease in the time of ab-

15. Jobling, James W., and Peterson, William: Jour. of Exp. Med., 1914, XIX, 239-50.
16. Same Authors: Ibid, 1914, XIX, 251-8.
17. Same Authors: Ibid, 1914, XIX, 283-97.

18. Brückner, G.: Berl. Klin. Wochscher., LI, January, 1914, p. 108-4.

sorption, which occurred in from 3 to 4 days, thus differing from the findings in pneumothorax. This was found to be true in both normal animals and those injected intraperitoneally with tubercle bacilli. The injection of air did not in any way prevent adhesions, since in the animal not treated the bacilli were always found in a single well walled area, while in the case of those receiving the air they were generally distributed in the peritoneal cavity and especially conspicuous toward the region of the diaphragm. The question, therefore, arises whether the introduction of gases into the peritoneal cavity is advisable in tuberculous peritonitis, especially the dry form.

Before concluding, I wish to cite to you another interesting laboratory investigation that is being carried out at the Municipal Sanitariums, but which concerns mainly the tuberculous host and which may eventually lead us to the means of employing an indirect therapeutic agent.

Fishberg[19] in his new book on Pulmonary Tuberculosis states that, "Despite the external appearance of anemia frequently seen in many phthisical patients in all stages of the disease—which has given rise to the expression Great White Plague—no changes in the cytology of the blood characteristic of the disease have been found. In fact, it is noteworthy that many patients who look pale show an almost normal blood picture."

So far as has been determined the pallor found in phthisis is not explicable on the basis of any changes in the cytology of the blood. There still remain, however, two undetermined changes in the body which may explain this condition; i. e., a diminution in blood volume or a normal blood volume with a peripheral anemia and an increase in the amount of blood in the internal organs. Until within the past year the methods available for determining blood volume in human beings was not applicable to a large number of patients. Keith, Rountree and Geraghty[20] have now placed at our disposal a method applicable for this purpose carried out without any harm or inconvenience to the patient. The method consists of injecting intravenously a certain known amount of a non-toxic, slowly absorbable dye, vital red (disodium disulphonaphthol azotetramethyl triphenyl methane), which remains in the plasma long enough for thorough mixing, and the determination of its concentration in the plasma colorimetrically by comparison with a suitable standard mixture of dye and serum. In cooperation with Drs. R. T. Rodaway and J. P. Cleary investigations have been begun to determine whether there is a change in blood volume or plasma volume during the various stages of pulmonary tuberculosis and, if possible, to apply the knowledge thus obtained for therapeutic purposes if indicated. Keith, Rowntree and Geraghty found that normal individuals have approximately 50 c.c. of plasma per kilogram of body weight, the extremes being 42 to 56 c.c., while there is about 85 c.c. of blood per kilogram, the extremes being 78 and 97 c.c. per kilogram. We have thus far examined nine cases of pulmonary tuberculosis (all ambulant or cottage cases) by this method, and have found two of them with a low plasma volume—33.1 c.c. and 33.3 c.c.—and a low total blood volume—58.9 c.c. and 66.6 c.c., respectively, per kilogram of body weight. Of course, here again we are just in the preliminary stage of the work and are not justified in drawing any definite conclusions, but from these experiments it may be expected that a decreased blood volume will probably be found in at least a number of the cases of pulmonary tuberculosis. Whether this is explicable on the basis of the tuberculosis or some other condition remains to be seen.

19. Fishberg, Maurice: Pulmonary Tuberculosis, 1916, 224.

20. Keith, N. M., Rountree, L. C., and Geraghty, J. T.: Arch. of Int. Med., 1915, XVI, 547-76.

THE CLINICAL APPLICATION OF THESE PROBLEMS.

A DISCUSSION.

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In working out a therapy for tuberculosis, whether it be chemical, immunological, surgical or physical, we must first have a thorough understanding as to what we are treating. In other words, we must be able to pick out the different types of pulmonary tuberculosis that exist, and know them well enough to know what sort of therapy could be applied with any hope of success. Our clinical studies and observations have shown us that there are a number of definite types of tuberculosis encountered fairly frequently, and these types are different enough from one another to require different means of treatment.

The first type is analogous in many ways with the tuberculosis of the guinea pig. I refer here to the primary tuberculosis in children. X-ray study of these children has shown that there may or may not be a demonstrable lung lesion, but when the infection has taken place through the respiratory tract there are diseased bronchial glands which can be definitely shown on the x-ray plate. The tuberculosis follows Cornet's Law of Localization, which postulates that, regardless of the size of the lesion produced at the point of inoculation, the regional lymph glands are invariably involved, and this involvement takes place very shortly after infection. The same thing, of course, holds good for the human animal as well as for the guinea pig. In this stage of the disease a *therapia magna sterilisans* could be used, and would prove of enormous value.

Doctor Corper has further shown that tubercle bacilli will autolyze in the test tube, and that this autolysis takes place rather slowly when they die gradually, and more rapidly when the bacilli are killed by some antiseptic agent. The application of this fact in the therapy of tuberculosis of human beings, of necessity, limits the *therapia magna sterilisans* to those cases of tuberculosis in which the number of bacilli is small. If all the bacilli in the body of an advanced case of tuberculosis were to be killed at once, there would be so much toxin liberated by the process of autolysis that the patient would be killed just as one may kill a tuberculous animal with a large dose of tuberculin. A *therapia magna sterilisans* then would be applicable probably only in children, or in those patients who have exceedingly small pulmonary lesions and a moderate amount of regional lymph gland involvement.

Von Behring has said that "phthisis pulmonalis of the adult is the last verse of a song which is begun in the cradle." Clinically we find that the phthisis pulmonalis of adults is caused either by a reinfection of an already infected individual by inhaling organisms from his surroundings, as in the case of one who cares for a far advanced, careless consumptive, or is caused by the reinfection from within, due to the rupture of a tuberculous lymph gland into the bronchus, and the subsequent flooding of one or more parts of the lung with caseous tuberculous material out of this gland. Our investigations at the present time have not progressed to a point where we are able to say definitely in what percentage of cases the reinfection takes place from within, or from without, but such evidence as we have gathered seems to indicate that the large majority of the patients who have pulmonary consumption are reinfected from within. As mentioned before, the treatment of such cases with a *therapia magna sterilisans* would be absolutely dangerous and is out of the question, but possibly an agent which would inhibit the growth of these bacteria might be of some value. It is to be hoped that the laboratory workers will develop something along this line which may be of help to the clinician in his work. There are cases of cavernous phthisis, which, when they are unilateral, often give good results with pneumothorax therapy. I might say here that pulmonary surgery is still in the process of development, and it is possible that a certain class of cases may be quite materially helped by different forms of surgical treatment.

The ferments which exist in the tubercle bacillus are unquestionably of some importance. We are not able to say, at the present time, in just how far they are responsible for the breaking down of the body tissues and the subsequent wasting away of the tuberculous individual, but it is fairly certain that the breaking down of the tuberculous nodule is dependent, to an extent at least, upon these ferments. Possibly an anti-fermentative agent would be of some help in those cases whose involvement is so great that a *therapia magna sterilisans* could not be employed.

Doctor Corper's work on the virulence of the tubercle bacilli discharged by different individuals is of great importance in our campaign against tuberculosis. It was thought at one time that the patients who had cavities of long standing in their chests expectorated bacilli which were either dead or of such low virulence that their infective power was almost nil. It seems, however, that these organisms are equally virulent, regardless of how long the individual who is discharging them has been sick.

Knowing the great susceptibility of infants and children to tuberculosis, it is very clear that equal care must be taken in the disposal of the sputum of the far advanced case with that of the earlier case who has been sick a shorter period of time. The evidence seems to be accumulating to prove that the virulence of the organisms is of little moment, and that the size of the dose re-

ceived, either by an animal or by the human being, is of greater importance than the virulence, and determines, to an extent at least, the severity of the tuberculosis; this holds good in the case of primary tuberculosis of children, as well as the reinfection from within or from without.

The production of pneumoperitoneum for the treatment of tuberculosis peritonitis seems, according to Dr. Peschman's results, not to be of much value. It is difficult to draw a comparison between pneumoperitoneum and pneumothorax, because pneumothorax is based upon entirely different principles, and these principles are not applicable to tuberculosis of the peritoneum. It may very easily be true that pneumoperitoneum may result in the spreading of the disease, rather than in any therapeutic benefit.

THE INFLUENCE OF MIXED AND SECONDARY INFECTION UPON PULMONARY TUBERCULOSIS IN MAN.*

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In 1882 Robert Koch discovered the tubercle bacillus and demonstrated conclusively that it was the cause of pulmonary tuberculosis. Within recent years we have learned, by post mortem examinations and tuberculin tests, that almost every one that reaches adult life is at some time or other infected by the tubercle bacillus.

Why is it that approximately ninety per cent of our population recovers spontaneously from this tubercular infection and only ten per cent becomes actively and recognizably sick with tuberculosis? There may be two explanations: First, some individuals with very low resistance, may have an overwhelming infection by virulent tubercle bacilli; or, secondly, the tuberculous infection may become complicated by the invasion of other bacteria. Undoubtedly both of these conditions may occur but the degree of importance of both the primary and secondary infection in pulmonary tuberculosis is still a much disputed question. Some investigators consider the secondary invaders, more often streptococci, pneumococci, and staphylococci, of little or no importance, while other authors consider the tubercle bacillus of little importance in the production of active pulmonary tuberculosis and assign the major rôle to the secondary invaders. Between these two extremes are those who consider both the primary and secondary infection of importance but in varying degree.

This difference of opinion among investigators in this field is due largely to the inaccuracy and inadequacy of the methods used in the investigation of the problem. Clinical study gives no definite information; all the symptoms usually ascribed to mixed and secondary infection, such as high and irregular fever, chills, sweats, expectoration, emaciation, and peculiar skin odor, have been seen in cases showing only tubercle bacilli in the sputum and no secondary organisms on post mortem examination. On the other hand, cases showing pronounced cavities with many secondary organisms in the sputum show no fever whatever, but feel perfectly well.

Sputum examination is also unsatisfactory. Streptococci, pneumococci, staphylococci, the organisms most commonly considered secondary invaders in pulmonary tuberculosis, are found in the normal mouth, pharynx, and trachea, and when found in conjunction with tubercle bacilli in sputum it is impossible to separate those coming from the mouth or pharynx from those coming from the lung. In order to overcome this difficulty some authors have washed the sputum in a varying number of changes of sterile water, but even then it is impossible to separate the mouth bacteria from the organisms coming from the deeper portions of the respiratory tract.

Post mortem examination of the lung is far from convincing because pyogenic bacteria may invade the lung tissue as a terminal or agonal infection or even after death.

The results obtained by animal experiments are contradictory. Prudden found that inoculation of tubercle bacilli into rabbits produced tuberculosis but seldom caused cavity formation, but the intratracheal injection of streptococci into tuberculous rabbits caused a decided cavity formation. Marmorek, however, has been able to produce cavities by the use of tubercle bacilli alone if used together with large doses of tuberculin.

The leucocyte count is of some value but at best is an indirect method. While a certain grade of leucocytosis is perhaps indicative of the presence of mixed infection (the leucocyte count in

*Read at the sixty-sixth annual meeting of the Illinois State Medical Society at Champaign, May 17, 1916.

uncomplicated tuberculosis is usually normal or low), the limitation of the method in the study of secondary infection in tuberculosis is that the leucocytosis gives no information concerning the location or character of the secondary invading organism.

The opsonic index in the hands of various workers has not led to uniform conclusions. At best, it is a very inaccurate method, and, in my hands, at least, has been of no value.

Another method that has been used in the study of this problem is the blood culture method. It is generally conceded that the blood or tissues of the body not in contact with the outside air under normal conditions is sterile and the finding of bacteria in the blood is of definite pathological significance. Therefore, blood cultures have been repeatedly used to determine the presence or absence of secondary infection in tuberculosis and as in the case of the other methods cited, direct contradictory results have been obtained, but in this instance, I believe the confusion in results is due to variations in the technic of applying the method rather than in the method itself. At any rate, it is obvious that the evidence furnished by positive results far outweighs that furnished by the negative.

Blood cultures made after death are not convincing because terminal, agonal, or post mortem invasion are such important factors. Blood cultures during life in the hands of early workers were of little value because sufficient care in prevention of contamination from the skin and air was not used. Later workers, using more careful technic, drawing a larger volume of blood directly from a vein under aseptic conditions, have been uniformly unsuccessful in recovering streptococci or pneumococci from the blood. Twenty-four authors using venous punctures in the examination of 1,151 cases obtained only 31 positive blood cultures for streptococci and pneumococci, or 2.7 per cent. From these results Jockman, Reiche, Benohr and others concluded that if mixed infection is responsible for chills, fever, sweats, emaciation, etc., in pulmonary tuberculosis, their action is due to soluble toxins thrown into the circulation from an area of localized infection rather than due to a general bacteremia. The results of workers in this field using the blood culture method were uniformly negative as above shown, and their conclusions seemed justified, but a historical review of blood culture studies in other diseases shows that with the development of more careful bacteriological methods there is a marked increase in the percentage of positive blood cultures, and at the present time instead of considering typhoid or pneumonia as infections confined strictly to the lung or intestine, we now believe them to be general bacteremic infections as well as localized infections of the lung or intestine.

Because of the possibility that the negative results of previous workers may have been due to inefficient technic, and because of the conclusive character of the evidence furnished by positive blood cultures obtained during life, I decided to use this method of attack in the study of mixed and secondary infection in pulmonary tuberculosis.

This work was started in 1910, and in November, 1911,[1] the results of the examination of 130 cases were published in the *Journal of Infectious Diseases*. It was decided a priori that the most efficient technic would be one in which, first skin and air contamination were eliminated as nearly as possible, and, secondly—the organisms were cultivated in an environment as little different from the conditions under which they had been living in the human body as possible. The technic used at that time is given in detail in the report above cited, but briefly was as follows:

The blood 15-20 cc. was aspirated directly from an arm vein by means of a glass aspirating bulb of 25 cc. capacity. Cultures were made in agar and broth and in many instances a small portion of the undiluted blood was cultivated in the sterile aspirator or a sterile test tube. The blood agar plates and broth cultures were examined daily and in the case of positive results transfers and subcultures were made on blood agar, plain agar, potato, gelatin, milk, broth, serum inulin water, or serum inulin agar and cultural and microscopical study was carried out in each instance until the identity of the fully isolated organism was established. In all instances the organisms were streptococci, pneumococci, or staphylococci. All organisms showing the usual characteristics of the staphylococcus were discarded as presumably representing skin contamination, hence the results recorded as

1. Jour. Inf. Dis., 1911, IX, 237-250.

actual positive blood cultures have to do only with the streptococci and pneumococci. On this basis alone, of 130 cases examined, streptococci or pneumococci were isolated from the blood stream in 60, or 46 per cent. Streptococci were found in 36 cases and pneumococci in 24 cases; 58 of the 60 positive blood cultures were obtained from advanced and far advanced cases. The percentage of positive cases was greater in the far advanced than in the advanced cases; hence, as the disease progressed, the possibilities of obtaining a positive blood culture increased. The percentage of positive blood cultures obtained in cases with temperature below 100 degrees F. was 34 per cent, while the percentage of positive blood cultures obtained in cases with temperature above 100 degrees F. was 58 per cent—almost twice as many in the fever cases. From these data based upon the examination of a comparatively large number of cases, even though the results contrasted sharply with the results of previous workers, I was forced to the conclusion that not only are true secondary invading organisms of frequent occurrence in pulmonary tuberculosis but these organisms, found in the blood stream with increasing frequency as the disease progresses, are of definite pathological significance.

In 1913, in a report to the National Association for the Study and Prevention of Tuberculosis, Dr. Lawrason Brown and Mr. S. A. Petroff, of the Adirondack Cottage Sanatorium, Saranac Lake, New York, using a technic similar to my own, fully confirmed my results by a study of 157 cases. They found organisms present in the blood of 9 per cent of the incipient cases examined, in 24 per cent of the moderately advanced cases, and in 61 per cent of the far advanced cases. In other words, we both found higher percentages in the active, than in the quiescent cases, and the further advanced the disease, the higher the percentage of positive blood cultures.

More recently Rosenow has shown the importance of oxygen in the growth of streptococci and pneumococci, a factor that neither myself nor Dr. Brown took into consideration in our studies of secondary infection in tuberculosis. In their extensive studies on focal infections Rosenow and Billings have demonstrated the importance of oxygen pressure in the growth of these organisms and Rosenow has worked out a blood culture technic in which this factor is controlled. By this method the hemoglobin—the oxygen carrying element of the blood—is eliminated.

The technic is, briefly, as follows: Fifteen to 20 cc. of blood is aspirated into sufficient sodium citrate solution to prevent clotting. The decalcified blood is then transferred to approximately 200 cc. sterile distilled water. The distilled water dissolves the hemoglobin out of the blood corpuscles. The hemolysed blood is then centrifuged at high speed for 20 to 40 minutes and the hemoglobin containing water is poured off. The sediment is emulsified in approximately 5 cc. of sterile normal salt solution and from this anaerobic and aerobic cultures made in blood agar, dextrose ascites agar, dextrose ascites broth, Loeffler's blood serum and plain agar. Aerobic and anaerobic blood agar plate cultures are also made. The cultures are followed out for two weeks.

Using this method in a variety of conditions, Rosenow has obtained positive cultures by this method when the usual method has failed. Because of the importance of his findings it was decided to check up his method against the method previously used. In order to do this, instead of drawing 20 cc. of blood from the arm vein, 40 to 50 cc. was taken; half of this was planted as usual and half according to Rosenow's method. Eighteen cases were studied. No particular effort was made in the selection of cases, as the purpose of the study was the comparison of blood culture methods rather than the determination of the percentage of positive results. In the eighteen cases studied the method previously employed yielded two positive results, while by Rosenow's method eight positive results were obtained, or, in other words, for the cases studied Rosenow's method was four times as effective. From these results it is reasonable to assume that many of the negative cases reported in my former series were due to inadequacy in technic and that secondary infection is of even greater importance than previously shown.

From these studies the following conclusions, I believe, are warranted:

Practically all cases of active pulmonary tuberculosis are not pure tuberculous infection but primary tuberculosis secondarily complicated by pus producing bacteria. Therefore, in seeking

for new and better methods of treatment, the attack should be directed against these pus forming bacteria rather than against the tubercle bacillus alone.

DISCUSSION.

Dr. O. W. McMichael, Chicago: The work done by Dr. Pettit is of great interest and of extreme value.

The cause of fever in tuberculosis has been under discussion for so many years that we cannot but be grateful to those patient laboratory workers who by weeks and years of research bring out here and there proven facts which we can fit together to explain the cause of things.

The teaching that fever and cavity formation in tuberculosis are due to mixed infection rests upon two things, first the observation that fever is present during cavity formation, and, second, that in the laboratory examinations of the discharges from pulmonary cavities, pus-forming organisms, as well as tubercle bacilli, are found, and we draw the incorrect conclusion that the pus-forming organisms are responsible for the temperature and the destruction of tissue. The evidence presented by Dr. Pettit seems at first thought to support this view, because he proves to us that pus-forming organisms are found in the blood of a high percentage of febrile cases of tuberculosis.

Suppose, for the sake of study, we take the other side of the question and argue that only after cavity formation or destruction of pulmonary tissue by the tubercle bacillus can mixed infection occur. In support of this view let me call your attention to the increasing percentage of cases in which Dr. Pettit found these organisms in the blood as the disease advanced.

If we hold the view that the tubercle bacillus does not grow upon the surface of the bronchial tubes, but in the adjacent tissues, and finally accumulates in considerable numbers, that some of the bacilli in that mass die, that their soluble proteids are dialized, if we may use that expression, then we may argue that we have left behind the tubercle fat in concentration.

We know that tubercle lipoid in concentration produces necrosis. We have then that necrotic center beginning the necrosis, the necrosis increasing until the tissue at the weakest point next the bronchus breaks down, the contents of the mass discharged into the bronchus, then tubercle bacilli are found in the sputum and other organisms present in the bronchial secretions find a point of entrance.

Dr. Pettit's work proves to us that mixed infection is present in a high percentage of cases of pulmonary tuberculosis, but we have yet to account for the clinical picture in those cases in which mixed infection cannot be proved to exist.

Dr. Pettit, Sr., closing the discussion:

I am not at all competent to discuss this question from the laboratory side, as I am not a laboratory man. I will say, however, that this work was taken up at my suggestion. At that time there were different experimenters trying to recover these organisms of mixed infection from the blood but with indifferent success, and the work done in our laboratory developed that something along this line can be accomplished, as shown by the reports which have been made.

About four or five years ago the subject was regarded as of enough importance, for a committee of the British Anti-Tuberculosis Association to offer a very substantial reward for the best work done along this line. The man who took the prize, was the man who said the organisms could not be recovered. So you see he was mistaken. We are not contending that this has any particular value as the matter now stands, but all we contend is that it is a line of investigation that should be pursued until we definitely determine whether it has any practical value or not. I can only argue this thing from the clinical standpoint. I think we all agree that however much we may differ in our opinion as to the value of tuberculin we agree that it has more value in the so-called surgical forms of tuberculosis than in the pulmonary form. These cases are usually pure tuberculosis. We so regard them, at least, and that is the probable reason why we get better results from tuberculin in our surgical cases than in our pulmonary cases. We have got to be very careful how we make any statement. Any man has to be careful how he makes any statement based upon his personal experience, especially in a subject so complicated as that of tuberculosis, and especially where the number of cases upon which a conclusion must be based must be so large that they are usually beyond the limit of the experience of any one individual, however large his experience may be. But it seems to me, I have observed that in these cases where we have the low grade symptoms which we usually have in these cases, that the results of tuberculin are better than in the more acute cases, the probable reason being that we have other micro-organisms to deal with, and hence our tuberculin is not only not appropriate but is positively contra-indicated. This, however, is a mere hint. We are groping in the dark—we must not be too positive about anything on this question, and I do not want it to be understood that we are drawing any conclusions. Everything is tentative; the work is going on and we propose to prosecute it as far as seems to be profitable.

TUBERCULIN THERAPY

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No treatment in the past thirty years has been received with more enthusiasm or criticism than the treatment of tuberculosis with tuberculin. Upon its introduction by Koch in 1891 he and his followers believed they had discovered a cure

for tuberculosis in all its forms. Although later evidence proved their original contention untrue, accumulated evidence has proved that tuberculin therapy is of value in the treatment of tuberculosis when administered under certain conditions, to suitable cases, and at a proper time.

In 1891 Koch demonstrated the following facts: If a healthy animal is injected with a large quantity of tubercle bacilli the animal apparently does well for from ten to fourteen days, at the end of which time a nodule appears at the site of the injection which ulcerates, breaks down, and persists, finally causing death of the animal. However, if the animal injected be tuberculous a nodule appears upon the second or third day, which breaks down and sloughs off, leaving a shallow ulceration which rapidly heals.

If a healthy animal be injected with a large number of dead tubercle bacilli, suppuration at the site of the injection was the result. However, if the animal injected be tuberculous death occurred in from six to forty-eight hours, with all the symptoms of acute miliary tuberculosis. By injecting the tuberculous animal with small doses of dead tubercle bacilli he was not only able to avoid death but obtained marked improvement in the tubercular condition of the animal. Further experiment showed he was able to produce the same reactions in the tuberculous animal by injecting the cultural fluids in which the bacilli had been grown and filtered off.

The fact the cultural fluids produced the same reaction in the tuberculous animal as the dead bacilli lead to the assumption which was later proven, that the tubercle bacilli produced two kinds of toxin, namely, exotoxin or soluble toxin, excreted into the cultural fluids in which the bacilli have been grown, and an endotoxin or insoluble toxin contained in the bodies of the tubercle bacilli and not liberated except by their disintegration. These facts have led to the production of a great variety of tuberculins, however, they all have for their active principle the protein of the tubercle bacilli. This tubercular protein produces qualitatively always the same reaction whether the cultural fluids be used, the bacilli themselves, or the pure protein extracted from the bacilli. A product containing this protein is a tuberculin, and no substance which does not contain it can be so classified. Any substance which contains tubercular protein is a satisfactory tuberculin, the test of whose presence is the ability to produce a reaction. Bacteriologically it has been proved that exotoxins are probably products of bacterial metabolism and their distinguishing features are their stability, and the readiness with which they stimulate in the animal organism the production of neutralizing substances called antitoxin. It is important to point out at this time that tuberculin is not an antitoxin, not a neutralizer of the poison produced by the tubercle bacillus, nor a germicide directly killing the tubercle bacillus. Whatever differences of opinion exist regarding the exact mode of the action of tuberculin all observers are agreed upon this much, namely, that tuberculin acts by stimulating the patient, stimulating him to elaborate protective substances, or an inflammatory reaction about the area of the infection. By causing the production of protective substances in the patient's body the patient's tolerance for tubercular toxin is raised, changing him from a condition of hypersensitiveness to tubercular toxin to one of hyposensitiveness.

Before beginning tuberculin treatment the physician should select the patients to be treated with great care, with a sufficient knowledge of the subject to correctly interpret the various reactions that occur upon its administration. The most suitable cases for treatment are those with small localized lesions of infection that are not producing active symptoms, namely, tuberculosis of the lungs, tuberculosis of glands, bone, the eye, and so on. The most striking results of tuberculin treatment are seen in patients in good or, at least fair, general condition, with moderately or far advanced lesions. Many of these patients have reaped a measure of improvement from hygienic-dietetic treatment and then have for months remained stationary. Tuberculin is often just the stimulation required to start them upon a rapid course of improvement. Entirely unsuited for tuberculin treatment are those cases whose reactive powers have been spent in a long fight against the disease; patients who are being overwhelmed by a severe or widespread infection are not suitable cases for treatment. To administer tuberculin to such cases would not only be a catastrophe to the patient but a disappointment to the physician.

The reactions following the administration of tuberculin are manifest by local, focal and general signs and symptoms.

The local reactions are manifest by pain, soreness, redness and swelling at the site of the injection. As a guide to dosage I can not say that the local reactions are of value except in those cases where reactions do occur. When local reactions do occur I am of the opinion that they should be considered as danger signals that the dose has been too large. Providing the injection of tuberculin has been given under strict aseptic conditions, and care has been exercised to make the injection subcutaneously and not into the skin, and the dosage has been correct, I have not observed many local reactions.

The focal reactions are those occurring at the site of the lesion and are of an inflammatory nature. When the lesion is situated externally the reactions are easily appreciated, but when the lesion is in an internal organ severe reactions may occur undetected. Koch's description of the focal reactions in lupus gives a good picture of the changes. A few hours after the injection the diseased skin becomes red and swollen. As the temperature rises the redness and swelling increase and may reach such a marked degree that the tissues become brownish-red and necrotic. With the fall of temperature the swelling and redness decrease and may entirely disappear in a few days. The lupus areas are covered with crusts, which dry and fall off, leaving sometimes after a single injection a smooth pink scar. It is remarkable how absolutely specific is the selection of tuberculin for tuberculous tissue, none of the surrounding tissue or old scar showing the least evidence of reaction. In the case of pulmonary tuberculosis the reaction is evidenced by increased pain, cough and expectoration, and changes in physical signs previously noted. In cases of tuberculosis of bones and joints increased redness, swelling, heat and pain, with more evident limitation of motion and the appearance or increase of crepitus.

The constitutional or general reactions are manifold and varied. They consist of increased temperature and pulse rate, together with one or more of the following: chilliness, malaise, headache, general aching pains through the body, loss of appetite, nausea and vomiting. Of all the reactions of tuberculin, elevation of temperature is the most helpful, and of the greatest importance. It is the only reaction we are able to determine with certainty, and for this reason I place it first in importance among the reactions of tuberculin. The elevation of temperature in the tubercular individual following the administration of tuberculin displays several distinctive characteristics which have been noted after many thousand tuberculin reactions. These facts are as follows: The elevation of temperature following the administration of tuberculin is dependent upon the severity of the tubercular condition in the individual and the amount of tolerance which the individual has against the tubercular toxin. The elevation is dependent upon the quantity of tuberculin injected. From the observations made it has been found that the elevation of temperature in the tubercular individual comes on in from sixteen to eighteen hours after the administration. Elevations of temperature coming on before this period are not considered as being due to tuberculin injected. They are ascribed as being due to: 1. Faulty technic such as improperly sterilized instruments and injecting material. 2. A peculiar susceptibility which some individuals manifest to the diluent fluid, phenol. Those individuals who are susceptible to phenol have an elevation of temperature in from eight to ten hours after the injection associated with a diffuse rash consisting of miliaria. 3. Elevation of temperature from auto-inoculation due to changes about the site of the lesion. 4. Elevation of temperature due to the numerous changes which the tubercular individual is subject to, such as over-exertion, fright, and intercurrent infections such as tonsilitis and influenza.

The physician, having acquainted himself with the various reactions following the administration of tuberculin and the object of the treatment, should proceed in the following manner: The patient should be acquainted with the object of the treatment and instructed with the necessity of keeping an accurate record of all symptoms which follow the injections. He must be taught how to take his temperature and instructed to keep a record of the same. Unfortunately the average patient has not the means or no provision has been made for the institutional treatment of these cases. I believe if all cases treated with tuberculin could be placed in an institution where they could be closely observed by those familiar with this class of work the results would be much more uniform and encouraging. How-

over, by carefully instructing the patients the treatment can be successfully carried on in the home.

The actual treatment of cases is carried out in the following manner: Koch's Old Tuberculin, prepared by Lucius and Bruning, is used to make the various dilutions, and each dilution is 1/10 the strength of the former. An 0.5 per cent solution of phenol in normal salt solution is used as the diluent fluid. Four dilutions are made as follows: One part of pure tuberculin and nine parts of 0.5 per cent. solution of phenol makes dilution No. 1. One part of dilution No. 1 and nine parts of same solution of phenol makes dilution No. 2. One part of dilution No. 2 and nine parts of same solution of phenol makes dilution No. 3. One part of dilution No. 3 and nine parts of same solution of phenol makes dilution No. 4. Dilution No. 1 keeps for about two months. Dilution No. 2 may be kept thirty days; dilution No. 3, two weeks, and dilution No. 4, for a week. The dilutions must be kept in a cool place. At the expiration of the time stated the various dilutions must be renewed.

All utensils used in the preparation of the various dilutions are thoroughly sterilized before being used. The dilutions are kept in glass-stoppered bottles and a Luer syringe is used in making the injections.

The injections are given either in the arm or the back, and are preferably given between 3 and 5 P. M. Following the injections the temperature is taken every two hours for 48 hours, as it is the only accurate method there is to determine the nature of the reaction. Providing the dose of tuberculin injected does not cause an elevation of temperature above one degree of what is considered normal for the patient the dose is increased 1 minim at weekly intervals. Should the dose injected cause a reaction above one degree, the dose is decreased one minim at the next weekly injection, and is not given unless all symptoms of the previous reaction have subsided. The dose of tuberculin is not fixed and must be determined for each and every individual. In beginning treatment the patient is started upon a dose of 5 minims of dilution No. 3, and the weekly dose increased or diminished according to the reaction as stated above. When the weekly dose has reached 20 minims of dilution No. 3, begin with 3 minims of dilution No. 2, increasing the weekly dose until 20 minims are reached. Then begin with 3 minims of dilution No. 1, and increase the weekly dose 1 minim until a 20 minim dose is reached. At the end of this time the patient should be cured and immune to tubercular toxins, or sufficient improvement gained to warrant the continuance of the treatment.

The additional treatment of these cases consists of the most favorable hygienic surroundings and of physical and mental rest as much as it is possible to obtain.

204 E. Main street.

THE THERAPEUTIC VALUE OF THE U. S. P. TINCTURE OF IODINE IN THE TREATMENT OF TUBERCULOSIS AND OTHER INFECTIOUS DISEASES WHEN PROPERLY ADMINISTERED AND GIVEN IN PROGRESSIVELY INCREASING DOSES.*

JOHN RITTER, M. D.

CHICAGO.

Iodine is described in the National Dispensatory as a gastrointestinal irritant of intense severity, said to produce vomiting, diarrhea and collapse, still death has rarely occurred. Has death directly attributable to the ingestion of iodine ever occurred? It is further stated there that if death does not result from acute gastroenteritis, secondary fatty degeneration of various organs may take place. That iodine is given internally to a limited extent in the form of the tincture in 2 or 3 minim doses. Antidotes are also mentioned, such as starch mixed with water, white of egg, milk, bicarbonate of soda, etc., and the stomach should be emptied by means of the stomach tube and lavage, or by means of emetics to get thoroughly rid of the poison and opium or morphin administered for the relief of pain.

In a recent state examination for licentiate in medicine, appeared, among others, the following question: "What is the Chemical Antidote for Iodine?" And it may be assumed that the correct answer should be moist starch. But why iodine, why starch? Is iodine really such a toxic element that the physician must be impressed with this importance and be able, if sud-

*Read at the twelfth annual meeting of the National Association for the study and prevention of tuberculosis, Washington, D. C., May 12, 1916.

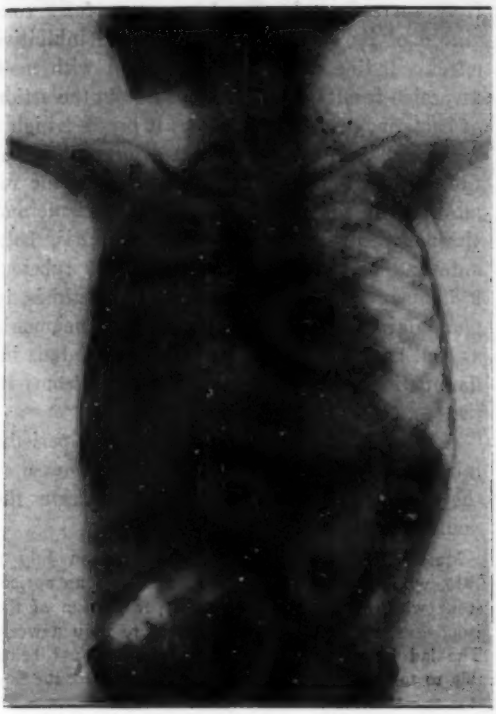

Fig. 1. Roentgenogram No. 1—Taken November 18, 1915, before treatment was instituted.

denly called in a given case of iodine ingestion, taken inadvertently or otherwise, to have the name of a proper antidote readily at his tongue's end? Is iodine at all toxic? Tincture of iodine U. S. P. contains 7 per cent of pure iodine, still the administration of 60 to 100 drops and more three times a day can be maintained almost indefinitely and without any untoward results.

A number of years ago Dr. A. B., then a very prominent physician in Chicago and who had a most lucrative practice, chiefly among a certain class of unfortunates, located temporarily at Hot Springs, Arkansas. Reporting to the medical profession, on his return, his observation on the use of iodide of potassium in chronic specific disorders given in connection with the warm baths, he stated that in a single day he had often administered 1,000 grains, or more than 2 ounces. This was made possible, in that, simultaneously with the administration of the salt, under the condition of the ingestion of large quantities of warm water and of frequent hot baths, the iodid was rapidly and completely eliminated from the economy, so that tissue disturbance and cell irritation were impossible. In consulting the literature on this subject, we will find that iodine in the form of an alcoholic solution or tincture, as well as all the various salts of iodine, have repeatedly been administered in extremely large doses by many internists, chiefly by French enthusiasts, but this was generally only spasmodically and never found great favor.

Dr. L. Boudreau of Bordeaux, France, who has given iodine very systematically for more than 10 years in pulmonary and other forms of tuberculosis, pushing the remedy to its tolerance, in writing about the use of iodine in the treatment of major infections recommends its systematic and extensive trial. He says:

It is indicated wherever there is infection. Iodine is a natural component of the body, does not accummulate, is rapidly eliminated, is both microbicidal and antitoxic; a tonic to the human organism and vital functions; stimulates the production of leucocytes, produces hyperleucytosis, and increased functioning of the glands, especially the ductless. Indicated wherever fever develops, in all inflammatory condition, in septicemia, in typhoid and typhus, in puerperal fever, in meningitis, measles, scarlet fever, whooping cough, pneumonia, etc. The internal treatment with iodine

Fig. 2. Roentgenogram No. 2—Taken January 1, 1916, after 43 days of Iodine Medication.

aids, not only in throwing off infection, reducing contagiousness, but wards off all complications.

He recommends in the treatment of diseases peculiar to children, especially in acute infections, the rapidly increasing small dose method, day and night. In whooping cough in children at about the age of 7, 60 drops are given during the 24 hours, and children at the age of 3 can take from 40 to 50 drops without apparent harm. In tuberculosis, the good effect of the administration of iodine in the treatment is due to the increasing of the leucocytes, especially the

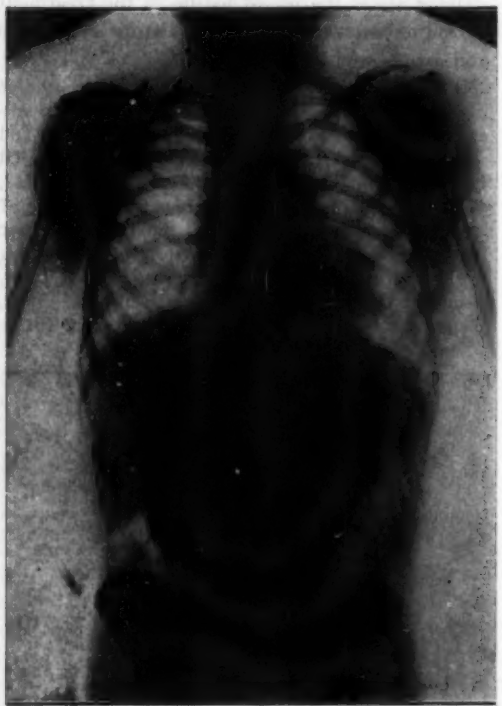

Fig. 3. Roentgenogram No. 3—Taken March 26, 1916, after 129 consecutive days of Tincture of Iodine ingestion.

mononuclears, and to the augmentation of the phagocytic activity. He has usually administered it in the accustomed beverages of his clientele, supposedly wine or beer. He has given the French Tincture of Iodine, which is a 12 per cent solution of pure iodine in 90 per cent alcohol, in large doses as high as 100 drops three times a day extending over long periods of time.

Having given iodine in the form of the U. S. P. Tincture, and which, by the way, is only a 7 per cent solution as compared with the French over a period of more than 2 years in progressively increasing dosage, I am now fully convinced of its decidedly beneficial and inhibitive effect. Iodine may be administered with most favorable results, in all diseases due to the action of bacteria, even in small doses it posseses highly bactericidal properties. In cases of pus formation with a tendency to absorption, for the removal of an inflammatory exudate, in acute and chronic pleurisy, tuberculous peritonitis, both ante and post operative, in pulmonary tuberculosis at any stage, in chronic fibroid phthisis, in glandular tuberculosis, in unresolved pneumonia as well as in the acute stage, in erysipelatous inflammation, in multiple abscesses, in osteomyelitis, etc.

A case history fully checked up by the periodic taking of roentgenograms during the course of the iodine administration may illustrate the point:

Master Phillip, Mc. D., aged 4 years, on July 3, 1915, while at play accidentally swallowed an apricot stone which was lodged in the upper portion of the esophagus where it remained for more than a week. The lad began to fail, to lose flesh fast, not being able to take food. Seven days after, July 10, the boy was anesthetized and an attempt made to either withdraw the stone from above or push it down into the stomach and not succeeding, the surgeon made an incision over the left upper chest near the sternal end of the clavicle and by means of his index finger in the wound attempted to dislodge the obstruction. By these various maneuvers the stone was finally moved from its moorings and passed through the bowel the following day. Seven days after, July 17, a left sided pneumonia developed, pursuing a natural uneventful course when in the following week suddenly the opposite lung became involved causing the parents much concern. From this time on, that was in the latter part of July until the latter part of November, the child showed all the symptoms of a profound pulmonary right sided involvement. I first saw the child at this time and found it to be very pale, emaciated, with a high temperature and very rapid pulse, a continuous unproductive cough, in fact, a very sick child and these conditions had now existed with more or less severity for nearly four months. Examination revealed a distinct bulging of the right lower chest accompanied by more or less moist râles on deep inspiriation, increased bronchial breath sounds and a distinct high pitched percussion note over the right upper. Fermitus could not be elicited as the child could not be induced to talk. Sputum secured for examination by forced cough showed the ordinary inflammatory exudate, some pneumococci, no tubercle bacilli. As a possible empyema was suspected, though doubtful, a roentgenogram was secured on Nov. 18, 1915, which, as you will see from the picture (Roentgenogram No. 1)

shows a distinct infiltration of the whole right lung with a comparatively clear left. The child after the first examination was placed on tincture of iodine in 20 drop doses three times a day and a perceptible improvement in the boy's condition was soon noticeable and so on Jaunary 1, 1916, a second roentgen picture was taken for comparison (Roentgenogram No. 2), this, after an interval of 43 days (between the two). This second picture showed a decided clearing up of the shadow and the intensive iodine treatment was continued until March 26 when a third picture was taken (Roentgenogram No. 3) and this showed that the entire right lung was clear and again normal when all further medication was suspended. Repeated physical examinations during all this time revealed a gradual and steady improvement in the lung condition. This child of 4½ years of age received during this period, that is, from November 18, 1915, to March 26, 1916, more than 129 consecutive days, approximately a teaspoonful of U. S. P. Tincture of Iodine daily.

It may be argued, that pneumonia is a self-limited disease, that most cases will clear up without and in spite of treatment, nevertheless we all know and we all teach that a pneumonia which does not clear up in from six or at the longest in eight weeks is, in all probability, a tuberculous affair. If the pulmonary tissue, the alveoli, bronchiols and tubes for long periods of time, are constantly bathed in this inflammatory material, accompanied by high fever and rapid pulse and the production and absorption of toxic products, irreparable damage to the pulmonary parenchyma cannot be long avoided. If the giving of tincture of iodine in intensive medication has not assisted in clearing up the lung conditions during the treatment of 129 days, what has done it?

When I first saw the child 124 days after the onset of the pneumonia, I beheld a very sick youngster and the very first thought that came to my mind after physical examination was that upon this boy's diseased and damaged pneumonic lung, a tuberculous process had been engrafted.

Now, for some time I have administered the U. S. P. Tincture of Iodine in progressively increasing doses in the various conditions of tuberculosis that came to my attention. In a number of cases of pleurisy with effusion, when the effusion was small and no attempt was made at aspirating, the ingestion of iodine has invariably been followed by amelioration of all symptoms of distress. In a case of tuberculous peritonitis the internal use of iodine was continued for almost a year after the operation, the patient, a farmer's wife, gaining more than 30 pounds in weight. I have administered tincture of iodine in tuberculosis of the mediastinal glands, in bone and joint tuberculosis, in tuberculous sinuses, in pulmonary tuberculosis of all and any stage and am much impressed with its helpful, serviceable and yet harmless action when properly and intensively administered.

Incidentally, I may state that my attention was only recently called to a most interesting case reported in the literature. A physician attending a patient who was suffering from facial erysipelas, prescribed tincture of ferric chloride to be administered in 30-drop doses three or four times a day and, calling on his client a few days later, was surprised to find him so much improved. The patient, in the course of the conversation, remarked that the medicine was all right but that he found it so strong he could scarcely take it. The physician examined the vial and found that tincture of iodine had been dispensed in place of the ferric tincture; however, he was so much impressed with the rapid results that in the next case of erysipelas which came under his care he resorted to the iodine medication at once and was again agreeably surprised by its prompt effect. I can attest to the value of iodine in the treatment of this disorder, having given it in three cases that came under my service recently with most gratifying results, but here again you may say that erysipelas is a self-limited disease, and while it must be admitted, yet the rapidity with which the inflammation subsides, the rapid lowering of the temperature and pulse and the well being expressed by the patient, speak louder than mere words.

A Safe Method for the Administration of Tincture of Iodine U. S. P.—The usual method recommended for the administration of tincture of iodine in either large or small, in progressively increasing dosage, is by means of a simple, ordinary vehicle, namely, mixed with good, wholesome, fresh cow's milk, and as the human system is tolerant to excessively large doses, the ingestion may be continued by this method over long periods, almost indefinitely. Beginning with a single drop in half a glass of milk with the first meal, two drops at the second, three at the third and so on until a dosage of 20 or 30 drops has been reached, then this amount may

be given three times a day and this maintained for some time. If it now be desired to increase this dose, then the gradually increasing drop method should be reassumed until 50, 60 or even 100 and more drops are given. When the highest single dose has been reached, this dose should then be given three times a day; should, however, an individual's idiosyncrasy show an iodine intolerance, then the dosage may be lessened or for a time entirely inhibited or suspended. Personally I have never observed a single instance of intolerance, nor of iodism, nor an untoward effect, no systemic or organic disturbance, nor any so-called toxic or poisonous effect during the entire period of iodine ingestion. As not only in the treatment of tuberculosis, but in all other disorders no matter what remedy, one may use good judgment and individualization as necessary, so in the administration of iodine. The patient must be under constant observation and if at any time symptoms of intolerance should manifest themselves, then the remedy may be interdicted. As the dose is but gradually increased and if it may be desired to lessen the amount, then the gradually decreasing drop method should be resorted to, lessening one drop with each meal. When the patient has shown marked improvement following the iodine intensive treatment, the dose may be decreased to one-half or less and maintained at that dosage almost indefinitely.

Various compounds, salts and modifications of iodine suggested for internal medication.—Within a comparatively short period, the medical literature on the internal use of iodine in the treatment of the various disorders due to the infectious diseases has been very materially enriched. In passing, it may also be stated that the advertising columns of many of the medical journals have not been spared.

Besides the use of iodine in its pure and crystallized form in an alcoholic solution, attention has also been directed chiefly to a so-called modified iodine said to possess active properties entirely different from the metalloid. We find some of these iodine modifications mentioned as possessing most wonderful antibactericidal properties, for instance, in the allotropic form said to be far superior in this non-crystallizable form, or in its combinations with the various proteins, said to be entirely free from all toxic properties and free from all irritating qualities and far superior to the chemical salts. Again, some are even said to be prepared by a most peculiar process, this process so to bind the iodine as to make it entirely harmless for internal use; in short, the ideal way for the administration of iodine. The solution of iodine in tannic or gallic acid, iodotannin, not a chemical compound, so much in use by many French internists, should also be classed in this category. It should be remembered that in whatsoever form iodine is used, in whatsoever way that it may be administered, the end results will always be the same. No matter if iodine is administered in its purity, or in the form of its salts, in the so-called modified or non-crystallizable, in its allotropic or in any other form, iodine will be found in the blood plasma, in the kidneys and tissues, in identically the same combination irrespective of the form of ingestion and irrespective of the method of administration, hence the simpler method, that by mouth, the most natural way, is always efficacious and more so than by the methods of absorption through the vagina or rectum by subcutaneous, intramuscular or intravenous injection. Most of the latter methods are cumbersome, some are more or less painful and offer no advantage over the simple method by giving iodine in the form of the tincture by way of the mouth with milk.

CONCLUSIONS AND SUMMARY.

It must be admitted, notwithstanding what has been said, that the ingestion of iodine, either in the free state in its purity, or in an alcoholic solution, may have a most irritating effect upon the gastric mucosa, and this is due to the sudden coagulation of the albuminous secretions from the mucous layers of the stomach, producing localized, highly hyperemic areas and the astringent and puckering effect which follow may cause serious disturbance. In giving the iodine in a menstruum, like sweet milk, one is quite sure to avoid all untoward symptoms and ill effects. Now the question arises: May it not be possible that the so-called toxic effect of iodine, if it is at all toxic, is positively averted by giving it in a vehicle like milk, which is its natural and physiological antidote, or again may it not be that the non-toxic effect is due to the preparing extemporaneously of an albuminate of iodine, a protein compound, when it is administered in

milk? Be that as it may, it remains an established fact that the giving of iodine in any reasonable dose, either large or small, will be tolerated by the most sensitive or delicate stomach capable of digesting milk and an iodine impression may be brought about by this method in a simpler way and with quicker results than can be accomplished by any other, be it by subcutaneous, intravenous or intramuscular injections, or by local applications. By this method the administration of iodine in the form of the tincture in from 60 to 100 drops three times a day may be maintained for months and months without the least fear of either a local or a systemic disturbance, hence, it may be stated definitely and observations have warranted the contention that;

1. Iodine is both microbicidal and antitoxic.
2. Iodine is non-toxic, non-irritant and non-caustic.
3. Iodine is rapidly eliminated and does not accumulate in the body.
4. Iodine does not coagulate albumin.
5. Iodine produces active phagocytosis.
6. Iodine is a recognized antiseptic possessing great powers for penetration.
7. Iodine, modified or in combination with various proteins, possesses no advantage over the ordinary tincture, when given in milk.
8. Iodine organic preparations are all changed in the economy, the iodine being liberated from its molecule.
9. Iodine, when given in milk, has never produced iodism or gastric disturbances; both are negligible.
10. Iodine as an inhibitor or destroyer of bacillary growth, within the tissues and organs of the human body, has no equal in medicine. Hence, it is the most logical and appropriate remedy for treatment of tuberculosis in all its various forms.

25 E. Washington St.

CHEMOTHERAPY IN TUBERCULOSIS.*

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COLLINSVILLE, ILLINOIS.

Tuberculosis is one of the oldest diseases of which we have a record. Traces of it have been found in the Egyptian mummies, and ever since the earliest times a specific remedy for it has been sought, but as yet it remains to be discovered. I believe that every known drug and a great many combinations of drugs have been used in the treatment of tuberculosis.

When Koch discovered the tubercle bacillus in 1882, that was the first great step taken in the universal fight on this dreaded disease. This brought forth great efforts, and a vast amount of work has since been done towards a specific remedy for tuberculosis, and all of this work has not been in vain, for while, as yet, we have no specific remedy for it we have several very important and valuable aids in the treatment and diagnosis, and I believe every year brings us a little closer to the goal for which all workers in tuberculosis are striving to attain. Personally, I believe that whenever a specific is discovered, it will be a chemical and not a biological one.

The principles of chemotherapy as advanced by Ehrlich are of such character that their application to infectious diseases are practically unlimited. The chemical agent employed must possess a much stronger affinity for the micro-organisms than it has for the body-cells, or, in other words, be more parasititropic than organotropic, and the greater the difference between these the more valuable is the agent and there is only one way of determining this value, and that is by animal experimentation.

As a result of the study of hundreds of different products by Ehrlich and other noted investigators it was found that after all there were only a few that exert parasititropic effect in animals, and they have been classified into three main groups:

1. The group of arsenical compounds.
2. Azo-dyes of the benzidin group, such as trypan red, trypan blue and trypan violet.
3. The group of basic triphenylmethane dyes, such as parafuchsin, methyl violet and others.

The tubercle bacillus, however, presents problems distinctly different from most of the other infectious diseases, owing to their peculiar construction, and also to their location in almost inaccessible places removed from the circulation, which, therefore, makes it necessary to learn what chemical or agent will not only penetrate a tubercle to reach the bacillus, but one that will readily penetrate an avascular tuberculosis lesion. The composition and construction of the bacillus

*Read before the Southern Illinois Medical Association, Nov. 3, 1916.

itself makes its destruction an entirely different problem than one of destroying trypanosomes, spirillae and spirochetes that live mostly in the blood itself, and have no protective layers of fat and wax.

The tubercle bacillus, with its fatty or waxy contents, has been found to be impermeable to fat soluble dyes, while many substances which are insoluble in fat but soluble in water, such as fuchsin and methylene blue, stain it quite intensely, which shows that the fatty content is not the chief factor to overcome. When fat soluble dyes are fed to tubercular animals the dye is absorbed with the fats, but does not penetrate into the tubercular lesion, which acts like any colloid, permitting crystalloids to pass through it.

The fact that water soluble dyes can penetrate the tubercle bacillus has lead to many experiments with various dyes, some of which were found to have properties possessing a selective action for the bacillus but exerted only a mild or no destructive action upon it, which it must do to be successful, in other words it is necessary to have a combination that has a haptophore group and a toxiphore group of atoms in its construction. It is not necessary that the whole molecule possess an affinity for the cell receptors, for it is presumed if one or more atoms become attached that the remainder of the molecule will be carried along.

In some experiments I have worked out with a combination of dyes, I find that by changing their chemical construction and substituting different atoms, I have now a combination with which I have made the following tests:

1. A culture containing two drops of the solution and streaked with virulent tubercle bacilli produces no growth.

2. A 10 cc. broth culture with tubercle bacilli to which 8-10 drops of the solution has been added, then kept at a temperature of 39 degrees for 12-24-36 hours at which intervals a loopful was taken and streaked on other culture, produced no growths.

3. A well developed growth of virulent bacilli on agar was covered with the solution and let stand in an incubator for 12-24 hours, and there was a good mass stain and good individual stain.

4. One drop of dilute filtered suspension of virulent tubercle bacilli in normal salt solution was added to 4-5 cc. of the solution and put in the incubator for 12-24 hours. One drop of this mixed solution and suspension was diluted with 4-5 cc. of normal sale solution and injected into pigs and rabbits, and after sixty-three days no tubercle had developed.

5. Rabbits were inoculated with tubercle bacilli and after 2-3 weeks 0.5 cc. of the solution was injected three times a week. Killed after one month's treatment, and where tubercle had developed an emulsion was made of them in normal salt solution and another rabbit injected in which no tubercle developed after about two months' treatment.

I demonstrated this treatment to the Madison County Medical Society in August, and asked them to send me a case or cases and have any one or number of the members examine and follow out the treatment. Three physicians from Edwardsville took advantage of that offer, and sent me what one of them termed "a dead one," which was not really a test. We would not expect salvarsan or anything else to cure some cases, but this case is still living, and has improved to this extent: His temperature was 101° daily and now it is 100°, his pulse was 120 and is now 100, he had a severe hemorrhage just before they brought him down, his appetite was poor; he has had no more hemorrhages, his appetite is good, and he has gained 12½ pounds since August 16, which I think shows the treatment will prolong life at least.

PREGNANCY IN THE TUBERCULOUS.*

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Pregnancy in the tuberculous has become a much discussed subject because of the agitation in favor of inducing abortion in tuberculous suspects and in actual tuberculous individuals.

It cannot be denied that the practice of inducing abortion in persons suspected of tuberculosis, without a demonstrable lesion, might readily become a source of abuse by furnishing a pretext for the performance of criminal abortions. But at the same time the fact that a tuberculous woman who has become pregnant runs very great risks of losing her life as a result of childbirth is a very stubborn one, and abortion should meet with serious consideration. Not only does she run the risk of losing her own life, but she also

*Read before the Tuberculosis Class of Rush Medical College, July 16, 1916.

runs the risk of bringing into the world an individual who will later become tuberculous and be a burden to friends and relatives, or to the state.

In spite of the amount of literature on the subject, the principles and proper methods of procedure have not been definitely determined by those most interested in the subject.

The impression that pregnancy predisposes to tuberculosis in a healthy woman may well be dismissed with the statement that pregnancy does not predispose to that disease any more than any other condition would with an equal amount of exhaustion and loss of blood. The tubercular germ must be present to produce tuberculosis. The field is but prepared for the reception and growth of the organism. When the germs have been sown, and no attempt made to check their growth, then must the individual succumb to the destructive toxines of the organism.

Early tuberculosis may not be recognized, that is, no demonstrable lesion of tuberculosis may have been discovered in a young woman and with the onset of gestation foci may light up, and in that way give the impression that pregnancy was the exciting factor.

Careful examination should be made of all pregnant women, or all young women who may become exposed to pregnancy, for the presence of tuberculosis. If an active process is found, it should be determined whether pregnancy should be terminated or not, and what procedure should be adopted.

Fetal tuberculosis was until recently considered a pathological novelty. Many cases of congenital tuberculosis have been recently discovered. DeLee, in his latest edition of Principles and Practice of Obstetrics, reports several instances where bacilli have been found in stillborn infants. The most common site of the lesion in fetal infection lies in either the liver or spleen, the organs which receive the umbilical veins.

Many have contended that tubercle bacilli were not present in the circulation until in the latter stages of the disease, but some explanation should be given why, if that is the case, tuberculosis should follow a slight injury to the bony structure in an otherwise healthy young adult. It is highly probable that a few bacilli get into the circulation, but cause no damage, being taken care of by the lymphocites, in every case of tuberculosis. The fact that they are not found may be explained by there being so few, and that the period of time the bacilli enter the circulation may not correspond to the time when the specimen is taken. Tuberculous meningitis is frequently seen where there is no demonstrable lesion, unless it should be a slight enlargement of some obscure lymphatic gland.

Tuberculosis is a systemic infection, and it is my belief that a bacteremia is present in the earlier stages of the disease. The infrequency of fetal infection is not due to the absence of bacteremia, but rather to the bacteriolytic action of the placental tissue.

Tuberculous pregnant women show a tendency to abort in proportion to the advancement of the disease. For instance, in the earlier stages 15 per cent abort, while in the advanced cases as many as 30 per cent may lose their conception. In the latter months of pregnancy the presence of large amounts of tubercular toxines in the blood cause the same reaction in the fetus that a large amount of tuberculin would, and consequently fetal death.

We do not see immunity in the offspring of tuberculous mothers, as would be expected if our well-thought-out theories of immunity were applicable to these cases; nor do we see any semblance of relative immunity. Most frequently the child is small, weak and puny, and later develops a strumous diathesis, and sooner or later falls a victim of the disease. However, some die in utero from the effects of the toxines.

During pregnancy there are many things which the system has to contend against, and these added to the toxines of tuberculosis would be very liable to break down the patient's resistance and aggravate the disease.

The pregnant woman suffers from more or less nausea and vomiting, which is very weakening because of the loss of proper nourishment or the inability to take food. Then again there is the increase of nutrition required by the child for development. In addition, there are thrown into the circulation the products of fetal metabolism which, with the weakened and diseased condition of the patient, would not be disposed of without great strain on the organs of elimination.

In the opinion of Farini the puerperal state we should endeavor to keep the mother in good aggravates the disease process. He states that condition regardless of the fetus. He would sacrifice the fetus early in pregnancy if there were

any evidence of activity; the better the mother's condition the more imperative that an early interruption should take place. Even in the latter months of pregnancy he would not wait until term, but would bring on premature labor to save the vitality of the mother. As a rule, abortion should be performed during the first two months of pregnancy, by simple dilatation and curettage. The woman when freed from the pregnancy should be given the best sanitarium treatment to build up her resistance to combat the disease process.

According to C. S. Bacon of Chicago it is safe to perform abortion by curettage up to the twelfth week, but Keyes of Chicago prefers to do a hysterotomy on women who have passed the ninth week, especially where it is advisable to sterilize the patient.

Unless the prospects were good for saving or prolonging the life of the mother, abortion should not be performed, but rather we should lend our efforts toward saving the child, as it would not be justifiable to destroy the life of the baby, even though the dangers are great that he would later develop tuberculosis, when the life of the mother is despaired of.

The tendency to sterilize every tuberculous woman is not justified, because in many cases the woman has recovered and in later years given birth to healthy children without danger to herself. However, a woman who has had a demonstrable lesion should be advised to wait until at least five years have elapsed after apparently being cured before becoming pregnant.

Where the disease has advanced, abortion should be induced early, and at times hysterectomy should be done. This especially is advised where there is suspected tuberculous infection of the uterus and its adnexa, or where the patient suffers from profuse menstruation and it is desirable to check the loss of blood at the monthly periods.

Early tuberculosis may not be recognized until in the puerperium, when the patient does not do well. There may be a constant low-grade fever which baffles the obstetrician until his attention is directed to the chest, or a higher temperature with the onset of miliary tuberculosis and rapid progress of the disease noted.

Where there has been a quiescent lesion for a number of years, the obstetrician and internist should watch the patient carefully. The obstetrician should direct his efforts toward alleviating the distressing symptoms of early pregnancy and endeavor to carry his patient through her pregnancy and lying-in period with as little loss of vitality as possible, and the internist should watch for any evidence of an active lesion making its appearance.

The hard and fast rule that no tuberculous woman should marry will not be observed; however, every young woman infected should be warned of the dangers of pregnancy, and advised as to the best means of prevention of conception until she has been free from all symptoms of the disease for a number of years. She should also be told of the dangers of infecting her consort.

A woman who has tuberculosis may endure pregnancy and apparently be benefited by it, only to advance rapidly during the puerperium and during the few months following from the demands made on her system by the nursing infant. Therefore she should not suckle her child, nor for the child's sake fondle it. It would be better that she be placed in a sanitarium and the child fed by a wet nurse.

When pregnancy has passed the fifth month, watchful waiting should be the policy. At the end of the ninth month premature labor should be induced. Dilatation must be secured with as little physical effort on the part of the mother as possible, and for this it is best to use a metreurynter. The exertion required to expel the child, with intra-abdominal pressure, frequently disseminates the bacilli and the disease progresses rapidly. When the uterus is fully dilated, the membranes should be ruptured, forceps applied and the child delivered. Gas or spinal anesthesia may be used.

To summarize:

As a general rule, tuberculous women should not marry.

Tuberculous women should not become pregnant.

If they become pregnant, they should be aborted in the first two months of pregnancy.

If later than two months pregnant, hysterotomy may be the best method of procedure.

Patients should be free from symptoms of the disease for at least five years before risking pregnancy, and then only under good medical and obstetrical supervision.

Tuberculous women in the early stages should not be sterilized.

Tuberculous women in the advanced stages may require hysterectomy to preserve vitality.

Tuberculous mothers should not nurse their offspring.

Tuberculous mothers should not fondle their children.

A FEW REMARKS CONCERNING THE DIAGNOSIS OF EARLY PULMONARY TUBERCULOSIS.*

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The open air and sanatorium treatment have brought about a very definite change in our attitude toward pulmonary tuberculosis. A new note—one of optimism—was added to a hitherto hopeless subject. The truth slowly dawned upon the medical profession and upon the laity that by far the greater number of cases were curable; curable, provided the treatment was instituted early in the development of the disease.

The realization that the greatest scourge of mankind could be mastered, resulted in a new and sustained enthusiasm. And so we find the medical profession, the government, various municipal and private bodies joining in the campaign against this universal malady.

The one important factor in the campaign is the early recognition of cases. Not until we can diagnose them early can real progress be made. This is pre-eminently the doctor's part of the task.

Let us first agree as to what we understand by incipient pulmonary tuberculosis. According to the classification adopted by the National Association for the Study and Prevention of Tuberculosis, it is as follows:

Slight or no constitutional symptoms (including particularly gastric or intestinal disturbances, or rapid loss of weight). Slight or no elevation of temperature or acceleration of pulse at any time during the 24 hours. Expectoration usually small in amount or absent. Tubercle bacilli may be present or absent. Slight infiltration limited to the apex of one or both lungs or a small part of one lobe; no tuberculous complications.

When all the new signs and symptoms, laboratory methods, not excluding the tuberculin test and roentgenography, are considered in the light of their practical value, there still remain only two procedures upon which our diagnosis must rest. These are: The history of the patient and the physical examination. I shall further state that of the two the history is by far the more important. We must learn to diagnose them before definite physical signs make their appearance. The ability to obtain a good history presupposes, among other things, an accurate conception of the disease process, its pathology and symptomatology.

What is the fate of a tuberculous focus in the lung? The reaction which it provokes results in the production of a round cell infiltration with subsequent deposition of calcium salts and encapsulation. For a while that ends it. At some later date when the resistance of the individual is lowered through disease, repeated childbirths, prolonged lactation, worry, overwork, excesses in alcohol, etc., the focus may take on a new activity and then cause symptoms. I propose here to use Pottenger's classification because of its comprehensiveness. He divides them into three groups:

1. Those due to toxemia.
2. Those produced reflexly.
3. Symptoms directly due to the tubercular process.

1. Symptoms produced by the toxin absorption manifest themselves by early tire and diminished energy. Patients claim that their routine work becomes a burden to them. Often they display an irritability. There is a slight loss of weight, and, very often, a marked loss of strength. In short, a combination of symptoms referred to by the laity as "rundown" and passed so frequently by the profession for neurasthenia. Other symptoms are fever, acceleration of the pulse rate, chills and sweats.

Is there anything pathognomonic in this picture? No toxemia due to any other cause can do the same; for example, bad tonsils, tooth-abscess, infected prostate.

"In the second group we see symptoms the result of reflex irritation; cough, pain in the chest, hoarseness, tickling in the larynx, muscle spasm and muscle degeneration. On the part of the lung lesion proper, oft-repeated colds, bloody sputum, hemorrhage, bacilli in sputum." (Pottenger.)

*Read before the Chicago Medical Society, Nov. 1, 1916.

With this in mind we can proceed more intelligently with the history taking.

What about the patient's family history? We know that tuberculosis is not inherited, but we must not forget that the offspring usually begets a certain diathesis, a weak constitution, a tendency toward tuberculosis, or, if you please, a lack of resistance against this and other infections.

Of greater importance than this is the question of direct exposure to infection from actual cases in the family. We should, therefore, inquire carefully into the present state of health of each member, the exact cause of death, if any have died, and, above all, one should not be misled by such terms as "decline, chronic bronchitis, weak lungs, dyspepsia, nervousness, anemia," etc.) (John R. Hawes, Jr.)

It is not sufficient to know that in your patient's family there is, or was, a case of tuberculosis. This information to be of value must also tell us how long and how intimate the exposure was.

In the past history, measles and whooping-cough are of importance in early life. Of the diseases and abnormal conditions which are apt to come later in life there are five, as pointed out by J. R. Hawes, Jr., which are of special importance as related to a possible tuberculosis. These are: (1) Pleurisy, (2) influenza, (3) bronchitis, (4) "run down," (5) fever or slow fever.

The occupation of an individual is of great importance. The question of conditions under which one works, exposure to variable temperatures, fumes, gases and dust; long hours and poor ventilation; home conditions, the conditions under which the individual sleeps—ventilation of bedroom—exposure to tuberculosis in the place of employment and finally the habits; excesses in alcoholism, deprivation of sleep, insufficient food and syphilis, are all etiological factors of greatest importance and, therefore, should be thoroughly investigated in each case.

We next come to the patient's present illness. It is important to ascertain the beginning, the first deviation from the normal. In many cases the first symptom is found to be a constitutional one, such as loss of strength or energy, fever, etc. *The most important symptom of all is the presence of fever, and next to it is acceleration of the pulse.* The temperature should be taken for at least one week at 8 a. m., 12 m., 4 p. m. and 8 p. m. The *importance of any persistent though slight rise of temperature above normal is well known; the equal or even greater importance of a constantly subnormal temperature, combined with a rapid pulse, over 100 or 110, has not been sufficiently emphasized. In no other disease are relatively slight variations in temperature so important.* Combined with the loss of weight and strength and other suspicious constitutional symptoms, a slight afternoon fever up to 99.2 or 99.4 or a constantly subnormal temperature with rapid pulse, may be considered pathognomonic of a tuberculous infection, whether or not definite signs are found in the lungs. Hawes, in his book on the early pulmonary tuberculosis, says: "If the stethoscope were used less and thermometer more, fewer mistakes would be made."

Next in importance are loss of weight and loss of strength. Vasomotor disturbances, such as flushes and chilly feelings, are frequently met with in early cases. Actual chills and night sweats belong to a more advanced stage.

Hoarseness due to reflex relaxation of the vocal cords and not to any tuberculous process, is a very common and early symptom.

Cough is an early and most constant symptom, and is important because it draws the attention of the patient and the physician to the lungs. Any cough which lasts over four weeks requires careful investigation and should be considered as strongly suspicious of tuberculosis.

Frequently there is no sputum, just as there may be no cough. When there is sputum, however, it should always be examined. To increase the amount of sputum brought up, one may give syrup of hydriodic acid or iodide of potassium. But the *most important thing to learn about the sputum,* as Hawes insists, *is that the failure to find the bacilli in it does not rule out tuberculosis. A negative sputum should be looked upon as a rule rather than the exception.*

The best method of sputum examination is the antiformin method.

Symptom hemorrhage is too well known to need any discussion. Any hemorrhage from the mouth should be considered as definite evidence of pulmonary tuberculosis until proved to be the result of some other process. In connection

with this some of the members of our profession would do well to get rid of certain superstitions such as "Vicarious menstruation" and "bleeding tonsils."

Physical Examination.—When you stop to consider that physical signs are so often absent, and that so frequently the results of a painstaking examination are extremely meager as to findings, you will agree that the need of a systematic routine method is great. Under this heading it is well not to forget other disease conditions than tuberculosis. So that in every case it is not the lungs that we are examining but the individual. The examination should include the entire body.

You will pardon me for being so elementary as to remind you that a systematic examination of the chest begins with inspection and is followed by palpation, percussion and auscultation.

You will find in most text-books and treatises on the subject that inspection and palpation reveal very little if, indeed, anything. This statement must be seriously modified. As we all know for some time, there may be a slight retraction of an apex which will manifest itself by a deepening of the supraclavicular fossa. There may be a slight lagging of the chest in breathing on one side, which speaks for an involvement of the apex on that side. This observation can be made only with the patient breathing quietly. If you have him take a deep breath, the slight defect in muscular function will be overcome. (Pottenger.)

In connection with inspection and palpation, let me draw your attention to the so-called Pottenger sign. Francis Pottenger of Monrovia, California, describes, in a book, result of some twelve years of observation, a so-called muscle spasm—a viscero-motor reflex.

This viscero-motor reflex, as expressed by muscle spasm, has been of the greatest value to us in the diagnosis of intra-abdominal inflammatory conditions. In acute appendicitis, cholecystitis, perforated ulcer of the stomach, we find a local rigidity of the muscles.

Let us consider the case of acute appendicitis. One of its earliest signs is local rigidity of the belly wall. This is not the result of a local peritonitis, but is due to the irritation of a corresponding segment of the spinal cord with resultant efferent motor stimuli.

Pottenger insists that the same phenomenon takes place in the lesion of the lung tissue. The lung is supplied by the vagus and the sympathetic nerve fibers. The irritation of these is communicated through the rami communicantes to the spinal nerves and through the latter to the corresponding segment of the spinal cord. In response to these afferent stimuli, the cord sends out efferent motor stimuli, which result in a muscle spasm—precisely as in the case of acute appendicitis.

According to the same author, the earliest signs are found in a hyper-tonus or spasm of the muscles, or portions of the muscles, overlying the apex. These muscles are the trapezius, the scaleni, the sterno-cleido-mastoid, and the rhomboids. The sign can be appreciated by inspection, but still more readily by gentle palpation.

If this state of muscle spasm continues any length of time, atrophy (overwork atrophy) takes place. Muscular degeneration in pulmonary tuberculosis is always a local affair.

Those of us who had the privilege of seeing Dr. Pottenger pick out lesions by inspection and palpation alone, with a most astounding ease and precision, believe that there is something in the sign. In summarizing, I wish to say that both inspection and palpation as methods of diagnosis in the incipient cases assume a tremendous importance in the light of Pottenger's work.

Percussion, generally speaking, is a very difficult method to master. It requires years of practice and even then is often misleading. Both Krönig's and Goldscheider's methods in mapping out the apical isthmus of resonance have not helped us very much except, perhaps, to teach us careful percussion of apices.

Everyone knows that pronounced dullness means consolidation, but in comparing the pitch of the percussion sound, one should take into consideration the existence of disparity in the thickness of the chest wall. Muscle spasm and muscle degeneration again play an important part here.

Auscultation is by far the most delicate of all methods, and gives us the most reliable, as well as the earliest signs of consolidation. To be of value, however, our students must be taught to appreciate what constitutes normal breath sounds, and then the deviations from the normal—the

broncho-vesicular and the bronchial or tubular breathing. High-pitched prolonged expiration is a most suggestive and important sign of early consolidation. The persistent presence of râles in a localized portion of the lung, such as the apex for example, is pathognomonic. The râles may be very few and hard to detect. They are usually heard at the end of an inspiration. There are several ways of bringing them out; by asking the patient to cough or to whisper (Beifeld) and then take a deep breath. No examination of the chest can be considered complete without auscultating after forced cough or whisper.

John B. Hawes, Jr., summarizes the situation as follows:

> In the majority of our leading medical schools the subject of tuberculosis receives scant attention. Students are still taught that in order to make a definite diagnosis of pulmonary tuberculosis there must be bacili in the sputum of marked evidence of consolidation in the lungs as shown by dullness, bronchial breathing, increased vocal or tactile fremitus and râles. That a diagnosis can and should often be made without a positive sputum and without many of these signs in the chest is rarely brought to their attention.
>
> This is an unfortunate state of affairs. We can never hope to handle tuberculosis successfully until every physician and every medical student realizes (as many of the public now do) that the all important points in the diagnosis of early tuberculosis are not bacilli in the sputum, nor definite signs of an active process in the lungs, but constitutional signs and symptoms which show only too clearly, were they but correctly interpreted, that the patient is sick. A diagnosis to be an early diagnosis must be made before there is breaking down of tissue with bacilli in the sputum; in most cases a positive sputum means moderately advanced tuberculosis and that many of the patient's chances are already gone. At present great efforts are being made to isolate and segregate advanced consumptives, but such efforts will be of little avail unless patients are discovered and put under treatment when in the incipient and curable stages, and a check thus put to the large number of consumptives who each year fall into the advanced class.

And now it remains to consider the value of the tuberculin test, and roentgenography. The most important question to establish in regard to the tuberculin reaction is its specificity. Lawrason Brown makes the statement that no case of early pulmonary tuberculosis has yet been shown to fail to react to a dose of 0.010 cc. or less of O. T. Its specificity seems to have been established beyond reasonable doubt.

The sub-cutaneous or intra-cutaneous methods are those to be used in adults. Three distinct phenomena may occur after an injection; first, a general or constitutional reaction. The patient begins to feel indisposed about 18 hours after an injection. This rapidly becomes more marked and he is soon willing to go or remain in bed. Severe headache, general malaise, pain in the back and the limbs, a slight tendency to cough, loss of appetite, in some cases nausea and vomiting, and, in severe reactions, profound prostration occur. The temperature often rises to 101, but may not reach more than 100 or may go to 107 without apparent ill results. The day following the temperature is again normal.

Second or focal reaction. When these changes occur, they are such as are produced by hyperemia in the tuberculous areas, *e. g.*, rough breathing, appearance of râles, increase in the sputum. Tuberculous glands or joints may show marked local reaction. Third, the local reaction at the point of injection.

The constitutional reaction is of value. However, the only interpretation to be placed upon it is that there is somewhere in the body a tuberculous focus. It does not tell whether it is in the lungs or in a gland, nor does it tell us whether the lesion is a passive or an active one. Upon the presence of this reaction alone with an individual in good health and without constitutional symptoms or physical signs one would not be justified in instituting the treatment, nor in pronouncing the patient tubercular.

Focal reaction in the lungs is of the greatest diagnostic value, but is said by the best authorities to occur in only about thirty per cent of early cases.

As to the action at the point of injection, not much reliance can be placed upon.

To sum up: In the presence of certain constitutional signs, a positive general reaction makes the diagnosis so much more positive, especially if the focal reaction is present. So that at its best it cannot be said that the tuberculin test can supersede or take the place of a careful history and a careful physical examination. Rather it should be looked upon as an additional method of value.

The use of the method requires a certain amount of experience and judgment, and can be carried out only under certain conditions. It

cannot be said to be entirely without danger, and if performed by those not skilled in its use, it is capable of doing great harm, not only by lighting up old quiescent processes, but by a wrong interpretation.

My personal experience with roentgenography is too short to justify a conclusive opinion. For some time at the Central Free Dispensary we tried to test its value. The work was always done and interpreted for us by an expert—Dr. Rowntree of Presbyterian Hospital. The results were quite interesting. At this stage I can only suggest a few tentative views:

1. To diagnose pulmonary tuberculosis from an x-ray plate alone is not a safe procedure.

2. In conjunction with a careful history and a physical examination, it becomes an additional method of value.

3. The shadows upon the plate do not tell us whether the lesion is a healed or an active one.

4. When the presence of the disease is established, our knowledge regarding the extent of it can be made much more certain by x-ray plates than by the physical examination.

5. Every suspicious chest should be x-rayed, for occasionally most surprising and unsuspected findings are thus revealed.

The method will, in my opinion, prove of considerable value in the diagnosis and in the prognosis.

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A RADICAL CURE OF OSTEOMYELITIS OF THE RIBS.

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Disease of the ribs are very misleading in that they deceive the surgeon in the diagnosis and lead to faulty treatment. This accounts, in a large measure, for the ineffectiveness of the removal of ribs after the disease has progressed to a stage where abscesses, suppuration, and sinuses have resulted.

During the past ten years I have had, under my observation and treatment, sixteen cases of diseases of the ribs, most of which have had one or more operations before I saw them. One case had sixteen. I have adopted a certain procedure in treating these cases, which is so effective that I desire to publish the principles which I have employed in obtaining these results. Of the sixteen cases treated, in ten, the disease was confined to the ribs, in the remaining six cases part of the sternum was involved. All of these sixteen cases were of the very chronic type, each giving a history of a long siege of suppuration and usually of being first treated for some other condition, especially intercostal neuralgia or rheumatism, sometimes for pleurisy. When the discharge continued, after the first operation, there usually followed a series of scrapings of the sinuses, which was, of course, of very little avail.

The etiology of the disease could not be determined in every case. In most it was tubercular, at least the pathological findings pointed to that form of infection. Three cases of rib infection gave a clear history of typhoid fever and in two of these typhoid bacilli were found in the secretion. Two of the cases were complicated with empyema and it is very likely that the empyema resulted from a tuberculosis of the rib.

In several of these cases in which diseased ribs had been previously removed and the suppuration persisted thereafter, it was found by subsequent investigation, through a method I will here describe, that another diseased rib was overlooked. The surgeons cannot be blamed for not having recognized the disease of that rib, because its surface appeared perfectly normal, the disease being on the under surface, or channeling through the cancellous portion. I shall show radiograms illustrating this graphically.

Results were as follows:

Fourteen cases are entirely healed, without recurrence.

One case was refractory to all forms of treatment. The patient moved to California, so that I lost track of him. He was not operated upon.

One case is still under my care and was operated on this week, so that I cannot report on the end result of the same at the present time.

The plan which I have adopted in dealing with these cases and which proved most satisfactory is as follows:

I first tried a most conservative treatment, namely, the injection of bismuth paste, a method which is well known to you. If this treatment

failed I then resorted to a *most radical operation*, which consisted in eliminating every vestige of the disease. The technique I will describe later.

I must here state that in this class of cases, namely, diseases of the ribs, the bismuth treatment was not quite as effective as it is found to be in other forms of chronic suppurating sinuses such as result from joint tuberculosis and other forms of chronic osteomyelitis. Of fifteen cases of this group only three healed entirely with the bismuth treatment alone, that is, without any surgical interference. The remaining twelve had to be operated upon before a cure could be accomplished. In other forms of osteomyelitis with sinuses we are able to clean up at least sixty per cent. of the cases without any surgical interference, while in this class of cases not more than 25 per cent. will yield to the bismuth treatment alone.

The reason for this is obvious, when we take into account that the disease of the ribs affect the medulla most frequently, the pus runs through the center of the bone, and the paste cannot be forced through the entire cancellous channel of the rib and fill all infected crevices.

The bismuth injections, however, were employed in every case for the purpose of making a correct diagnosis. The paste usually finds its way into the rib, which is affected, thus giving to the surgeon, through the roentgenograms, a definite guide to perform a successful operation. With this aid he will not likely miss a diseased rib, which sometimes appears normal on the outer surface, but is diseased in its interior, or on its under surface.

I consider the injection for diagnostic purposes in these cases as most essential and at the same time to enter a protest against the use of the probe as a reliable diagnostic instrument. The probe, no doubt, is at times a valuable diagnostic aid, but it very frequently misleads us, so that the harm that is frequently done through depending on its diagnostic correctness will far outweigh the assistance which it renders in diagnosis.

The probe is especially disastrous when we come to ascertain the depth of bone cavities, or of fistulous tracts. One need only to glance at one of these radiograms of injected sinus tracts to convince himself that the use of the probe to ascertain the course of the tract is ridiculous. The tip of the probe will be resting in the nearest pocket or recess of the tract and leave us under the impression that we have reached the end, when, in fact, there may be a network of sinuses in which the probe cannot penetrate.

The cases which would not yield to the treatment by bismuth injections were those which contained sequestra, where the disease penetrated the cancellous portion of the bone and the paste could not find its way to the focus of the disease. The treatment, however, was persisted in for several months before it was given up as inefficient, because now and then we could cure a case by injection which, in the beginning, did not show any tendency to improvement.

Wherever I did not succeed in stopping the suppuration by this conservative treatment, namely, by bismuth injections, I have gone to the other extreme and resorted to the most radical procedure, in order to eliminate every vestige of diseased tissue. I have found by experience that unless the entire diseased area is exposed and removed, an operation is practically useless; and this explained to me why so many of the cases operated on ten or fifteen times previously had not healed. It was because the surgeon was satisfied with a curettage of the bone cavity or the rib, without definite knowledge as to the extent of the disease, it often extending far beyond the point where the curet could reach.

At this point I wish to deprecate the blind method of curetting bone cavities by introducing the curet through the sinuses and scraping in all directions without ocular inspection of the cavity, which is being curetted. The method seems to me most inadequate and uncertain, mere guesswork as to whether one has reached all diseased areas. I have convinced myself many times by exposing these cavities and inspecting them after I have curetted them and found that I often curetted in the direction of healthy tissues and left most of the diseased area untouched.

The plan I have pursued in the cases which required operation is as follows:

After I had determined exactly which ribs or what part of the sternum were diseased, I made a most adequate curved-skin flap incision, which exposed a very large area and under ocular inspection I resected every vestige of the diseased bone. Then instead of closing the cavity by sutures, as was customary, I left the cavity entirely open, gaping, and packed it with gauze.

In the deepest recess of the wound the skin flap is placed and gauze packed against the outer surface of it, so that it may cover and line a part of the cavity. I never employ any suture material in the skin, but allow the surfaces to heal by granulations, and after the granulations have sufficiently formed, the margins of the skin and the granulations are covered with adhesive plaster strips. This procedure is quite effective in producing epidermization of the granulating wound, the epithelium growing rapidly from the edges of the skin towards the center.

I have described this method in detail elsewhere. I wish to state that since employing it I have given up skin grafting entirely. Surfaces four to six inches in width have been covered with new epithelium within three weeks.

The main objects in planning the operations were, *first*, to expose the diseased area by an adequate incision; *second*, to take away every vestige of the diseased tissues under the guidance of the eye; *third*, to close the wound in such a way as not to permit any dead space in the resected cavity; *fourth*, to use no suture material whatever except ligatures for arteries, and leave the wounds widely gaping; *fifth*, to reproduce epithelium of granulating surfaces without skin grafts.

Although each one of the cases that I have had under my care taught some points in the technique and treatment, I will not cite them all in detail, but for an example, I will cite one case and illustrate the method by some photographs and radiograms.

OSTEOMYELITIS OF RIB.

Arthur M., an American business man, 27 years old, weight 172 pounds, appearing in good health, gives the history of an injury in June, 1914, having fallen from a ladder about 18 feet. For several months he was apparently well, when in August a swelling appeared about two inches below the left nipple. It was painful on breathing and also on pressure.

He was operated upon by a competent surgeon; an abscess was opened and the rib curetted. There was no improvement; in fact, the field of infection spread and the swelling extended toward the sternum and also toward the axillary line.

A second operation was performed by two prominent surgeons and two ribs were removed, namely, the fourth and fifth anteriorly; but in spite of this extensive operation, the discharge was just as profuse as before and the pain as severe in breathing and on pressure.

I saw him in November, 1915. I injected the sinus and roentgenograms indicated that the disease extended into the sixth rib, affecting also the cartilage where it joins the sternum. (See Fig. 1.)

For landmarks in localizing this rib, I have outlined the costal border of the chest by placing some Victrola needles along the edge and then placing some vertically, pointing to the sinus opening. These give distinct information how far the diseased rib is from the costal arch.

Operation November 15. The exposure of the sixth rib was at first a disappointment; the entire length exposed appeared perfectly normal; the periosteum did not show any changes of inflammation. It would have puzzled me a great deal if I had not seen such cases before. I was absolutely certain that disease lurked in the interior of this sixth rib, and without hesitation I resected six inches of the rib, and as

Fig. 1. Method of Localizing Diseased Rib by Means of Victrola Pins.

is clearly shown by the radiograms and by the specimens which I have shown at medical societies, the disease was confined to the interior of the rib, extending into the cartilage. This also is shown in the radiogram; a little of the bismuth paste is still within its center.

I left the wound entirely open (Fig. 2). No attempt was made to suture, it was packed with gauze, thus spreading the wound still further apart. After 48 hours dressings were changed and vaseline poured into the depth of the cavity. The wound began to granulate, so that the adhesive plaster method of epidermization could be employed one week after the operation. One wide strip was pasted over the raw surface, so that it covered the edges of the skin and gauze was packed in the center to bring it in perfect contact with the granulations.

Within four weeks the wound healed entirely, as

Fig. 2. Wound Left Open Without Suturing for Epidermization.

Fig. 3. Wound Closing Without Any Suturing.

Fig. 4. Injecting Sinus Localizing Diseased Rib.

shown in Fig. 3. Pain and suppuration entirely disappeared. The patient now is in perfect health and the scar has become less prominent.

The appearance of stitch holes on the chest of the young man is due to previous operation.

I also wish to illustrate one radiogram (Fig. 4) which distinctly shows how the paste reaches the focus of the disease. This is a radiogram of another case. It shows the channel of the bismuth running through the center of the rib, injected at the point where we see the dark spot which is a buckshot which was placed as a landmark at the opening of the sinus.

In conclusion I wish to say that if this method is followed out in its detail, it will bring results which in former times we were not able to obtain.

SOME PAINFUL AFFECTIONS OF THE FEET

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Under similar titles the writer has previously discussed* the symtomatology and etiology of

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these painful feet affections, and it is with the idea of adding something in the way of treatment,—the result of fifteen years' experience and observation that this contribution is offered.

These cases are almost always seen first by the family physician, and because the etiology and pathology of these conditions have not been well understood nor sharply differentiated, the treatment has often been vague and inefficient.

In probably 75 per cent of the cases of painful feet coming to the attention of the orthopedic surgeon, the patients give a history of having been treated for weeks or months for rheumatism, and when the case is thoroughly studied and a correct diagnosis is made, less than 5 per cent are found to be due to that disease.

Pain and rheumatism have, in the past, been so generally thought of as synonymous, at least where joints were concerned,—and our pathologic conception of rheumatism has been so hazy, that the term has been a very convenient one to use when we did not know what the matter was; but with our better knowledge of joint disease and of the pathology of true rheumatism it is time to realize that, so far as painful feet are concerned, the chances are 95 to 5 against that being the actual trouble.

And right here at the outset I want to emphasize the necessity of careful examination in every case, not only of the feet but of the patient. Merely to listen to a patient's history of acute or chronic pain in his feet, steadily increasing, and with more or less disability, and then to tell him he has rheumatism and proceed to fill him up with salicylates, sending him on his way without even examining him or his feet, is surely a travesty on the practice of medicine, and an altogether too common one. Surely, rheumatism, like charity, covereth a multitude of sins, but chiefly, in medicine, sins of omission.

Our very dependence upon our feet in getting about our daily occupation lends added importance to affections of those extremities. We can suffer considerable pain and disability in the hands or other portions of the body and still pursue our daily occupation, but when one's feet "go back on him" he is "down and out" in every sense of the term.

The foot is an ingenious arrangement of arches and levers designed to receive and sustain the weight of the body and assist the muscles of the legs in locomotion. Anything that interferes with these functions renders locomotion awkward, difficult and usually painful.

It is because the feet have to bear the weight of the body and the arches and levers composing the foot are subjected to such a strain in supporting and propelling the body that the pain is located in the feet. In many conditions underlying painful feet the hands would be the seat of the pain if we were obliged to walk upon them.

To understand more fully the normal structure and function of the foot it is necessary to go back in man's ancestry to where the foot was allowed to functionate naturally, without the restraint of modern footwear. Indeed, if we study the locomotion of some of the plantigrade animals it may help us to understand some of the mechanical peculiarities of the human foot which still persist after ages of locomotion in an upright position. Watch a bear, and whether he be upright or on all fours, the inner border of the foot points inward and the step is finished with the toes and outer border of the foot grasping the ground. The first thing that strikes us in the gait of aboriginal man, untrammeled by footwear, is that he toes in. Normally, in the human foot the weight is transmitted from the os calcis outward and forward in a circular direction to the toes and the step is completed by the five toes successively grasping the ground. The arches of the foot, both longitudinal and transverse, are thus quickly relieved of the dead weight of the body and give an elastic springiness to the step which is their normal function. Compare the gait of your Indian or half-breed guide in the north woods, who has always worn soft mocassins, as he ambles along with toes turned in and knees slightly flexed, with the stiff-kneed, toeing-out gait of a man in modern shoes and see who can cover the greater distance with less fatigue. One is light, elastic, natural; the other heavy, stiff and tiresome.

Some of the most painful and disabling ailments of the foot are due to mechanical disturbances which interfere with these normal functions, and the most common of these is flat foot, frequently designated as "broken arches."

Clinically flat foot should be divided into three classes. I have designated these as: First, weak foot; second, flat foot, and third, rigid foot. While the difference is chiefly one of degree the prognosis and treatment of the differ-

ent classes vary considerably. The one characteristic of all forms of flat foot is the rotation inward and downward of the tarsus and the pronation of the front part of the foot, and as these distortions persist and progress the three types of the deformity are developed.

Weak Foot

A weak foot is one in which the arch becomes flattened when the patient stands, but the foot looks normal when not bearing weight, and *active* pronation and supination are still possible.

Pain develops usually in the latter part of the day or on fatigue, and tender spots are found at all times, usually under the scaphoid. Sometimes the pain is located chiefly around the external malleolus or under the heel.

Flat Foot

A flat foot is one in which the arch is flattened when the patient is not standing, *active* pronation and supination are lost and passive attempts to supinate the foot cause pain. Tenderness, often exquisite, is found about the scaphoid and os calcis, and the patient walks with a halting gait. These patients often complain of severe pain on first arising, but which wears off later, after they have been about with shoes on. Later in the day they may have pain up the leg to the knee or even to the hips, and occasionally a dull backache. The flat foot differs from the weak foot in that the *patient* has lost the power to supinate the foot but it can be passively supinated by the physician.

Rigid Foot

In these cases the foot is pronated and cannot be either actively or passively supinated. The tarsus, especially the scaphoid and astragalus, are rotated inward and downward,—often to such a degree that the scaphoid comes in contact with the floor, the astragalus is seen projecting beneath the skin, the arch is entirely obliterated, and the patient walks with a halting, shuffling gait and with the feet turned out. The peronei tendons are contracted and stand out stiff and prominent behind the external malleolus and any attempt to supinate the foot increases the peroneal contraction.

Pain is often less severe in these cases than in either of the first two classes, because the stage of severe pain is past, as the ligaments are relaxed and stretched to their utmost, and the foot has a bony support. The patient at this stage is extremely disabled, can walk only short distances without becoming fatigued, and cannot run at all. All movements at the ankle are limited and the foot is practically a stiff, unyielding stump.

Such feet are usually seen in patients past thirty-five, although occasionally they are found in young adults.

Before discussing the treatment of flat foot, it is necessary to consider the various causes of the trouble, as the successful treatment often depends upon the treatment of the underlying cause as well.

Etiology

Flat foot of any degree may be due to one or more of the following factors:

1. General muscular weakness and relaxation. This form is most frequently seen in adolescence or young adult life in patients with weak, flabby muscles, relaxed tendons and of lazy or phlegmatic temperament, who take little active exercise.

2. Traumatism. Any sudden injury to the supporting tissues of the plantar surface, such as falls upon the feet, Pott's fractures, etc.

3. Disproportion between the supporting power and the weight to be carried: *e. g.*, patients who change from sedentary occupations to carrying heavy weights and those who suddenly increase markedly in weight.

4. Long continued standing or walking on hard floors in improper shoes: *e. g.*, nurses and waiters are frequent victims.

5. Chronic toxemias, especially those due to gastro-intestinal decomposition, especially of proteid foods. Some of the most stubborn cases are due to this cause alone, and its importance as a causative factor is generally overlooked. Many women date their trouble from a certain pregnancy, associated with more or less toxemia.

6. Acute infections, such as scarlatina, diphtheria, typhoid, tonsilitis, influenza and gonorrhea. Severe attacks of influenza in elderly patients are frequently followed by weak and painful feet. Gonorrheal infections are so important in this connection and have so many characteristic points of interest that the subject will be more fully considered further on.

To be sure, some toxemic or infectious process may be responsible for the weakening and giving away of the tissues which support the joints and arches of the foot—but this toxemia is due to some suppurative, infectious or putrefactive process and certainly cannot be called rheumatism. Undoubtedly one of the most frequent causes of painful feet is the wearing of shoes which subject the feet to constant strain by compelling them to support the weight of the body in an unnatural way. Hoffa, of Berlin, once asked me: "Why do all your American shoemakers make valgus shoes?" By "valgus" shoes he meant shoes which are so balanced that the weight is thrown toward the inside of the foot instead of the outside. In the natural gait the great toe points directly forward and the weight is transmitted from the heel toward the second and third toes, and as the weight is transferred to the other foot, the step is completed by the toes grasping the ground (or shoe) and thus giving a springiness to the gait. When the foot is confined in a shoe which is balanced in such a way that this gait is impossible and the weight is thrown inward from the heel and the toe points outward (valgus shoes) then there originates a strain on the arches and supporting tissues which soon produces painful and weak feet, and it is only a step from weak feet to flat feet. Flat feet, if not relieved, sooner or later become rigid feet, and then all elasticity is gone.

In the same way shoes with sharply pointed toes, narrow shanks and high heels, such as worn by most women of fashion, and especially if the shoes are too short, which is often the case, cause great strain to be thrown upon the transverse arch of the foot, causing a flattening which is often accompanied by an excruciating spasmodic pain, known as Morton's metatarsalgia. This very common ailment, for which I have seen various operations performed, including amputation of the metatarsal heads, can be almost immediately relieved and eventually cured by fitting the foot with a proper shoe and supporting the transverse arch with a graduated pad. In this same group of ailments due to mechanical causes should be included hallux-valgus, because the initial distortion of the great toe is undoubtedly caused by ill-fitting shoes, but associated with this distortion—at least in the severe cases—is frequently a gouty or rheumatoid arthritis, which co-operates, so to speak, with the malposition of the toe to produce the bony enlargement and the inflammatory articular changes which take place. The deformity is easily and permanently cured by operation, but by no other means, and the patient must ever after wear straight-lasted shoes which make no pressure on the great toe. The next group comprises those cases due to acute infections of which gonorrhea may be taken as example. We speak of them as "gonorrheal feet," not gonorrheal flat feet, nor gonorrheal arthritis, although most gonorrheal feet become flat if untreated, and there are cases in which a true arthritis develops and accounts for part of the pain. But the changes which occur in gonorrheal feet are periosteal and peri-articular rather than intra-articular, and these changes are so characteristic that the surgeon who is familiar with them does not ask: "Have you had gonorrhea?" but "When did you have gonorrhea?" There is a peculiar thickening of all the per-articular tissues which is not accurately described as either an edema or induration. Perhaps infiltration is more accurate. The foot looks and feels "boggy" and there is a general sensitiveness of the whole foot. The patient complains of little or no pain when at rest but walking is sometimes almost impossible. The periosteum seems to be involved in the infiltration, especially the periosteum of the os calcis. Squeezing the heel in the hand or pressure on the tubercle on the bottom of the os calcis is usually extremely painful and the continued irritation of the inflamed periosteum causes exostoses to develop later at the insertions of the plantar fascia on the bottom and of the tendo Achillis behind. The prolonged infiltration results in a relaxation of the supporting tissues of the arches of the foot, and if walking is persisted in, the patient almost always develops flat foot.

Acute attacks of diphtheria and scarlatina, or even of influenza, may result in extremely painful feet. I have noticed this especially in the nurses at the County Hospital who have been on duty in the contagious wards and have contracted some infection. Though the infection may be mild, the nurse is often unable to go on duty for several weeks on account of pain in her feet. The trouble seems to be a distinct arthritis of a subacute type which affects one or two of the

tarsal joints or the ankle joint. The joints are very sensitive though usually not swollen, and motion and pressure are very painful. Severe attacks of the grippe, as I said above, especially occurring in people past middle age, sometimes result in such relaxation of all the fibrous tistues of the feet that the patient develops an acute flat foot upon standing, and is unable to walk on account of the pain. Another type of painful feet from an etiologic standpoint is due to autointoxication of some kind. They differ from the acute infectious group in being more chronic, there is little or no swelling and no history of any preceding illness. The patient, usually a well nourished, healthy looking individual, simply says that for a long time his feet have been gradually giving out until at last they cause him so much pain after standing or walking that he finds any prolonged activity impossible. He usually states that he has tried many varieties and shapes of shoes and has bought stock arch supports which are turned out by the thousands without regard for individual foot troubles. Occasionally a patient says he experienced some relief for a little while, after which his feet were "as bad as ever." He then concludes it is rheumatism.

Examination of the foot reveals nothing of note. When he stands the feet may be somewhat pronated and flattened and deep pressure generally reveals tender spots, usually around the scaphoid, sometimes about the external malleolus. The evidence is mostly subjective and is chiefly "pain." The joints proper seem to be free from involvement though there is, in some cases, a distinct thickening of the articular edges of some of the tarsus. In some cases there is a very sensitive periosteum, especially of the os calcis, as described in the gonorrheal feet.

But when these cases are carefully investigated there will usually be found a focus of suppuration, or decomposition, often unsuspected by the patient, but from which he is absorbing toxic products and probably has been for a long time. It may be a quiescent pus cavity in a tonsil resulting from an old forgotten tonsilitis, a chronic prostatitis, pyorrhea, sinusitis, chronic appendicitis, infected gall bladder, or a fermentative decomposition going on in the large intestine. I believe the latter is a much more frequent cause than is generally supposed. In many of these cases the urine is loaded with indican, and a large percentage admit being hearty meat eaters. The worst case of this type I have ever seen was a butcher who ate, according to his own story, from a half to a pound of red meats at each meal.

Treatment

In the treatment of flat foot, and, in fact, the treatment of nearly all forms of painful feet, four things are essential. These are rest, supination, support and exercise. In addition to these, operation may be necessary, as in cases with exostoses or contracted tendons, but whatever be the condition under treatment, if the predominating symptom is pain, the first four procedures are essential. It is worth while to discuss them more fully.

Rest. When a patient presents himself complaining of pain in his feet, after making a diagnosis I ask him if he has tried giving them rest. Almost invariably I find that he has been obliged to stay at home for a few days, but was about the house more or less, usually in old, soft shoes during that time. Frequently a patient states that his feet are better on Mondays after having rested over Sunday. In other words, while the patient himself had noticed that rest, though incomplete, is of marked benefit, he has never followed out the suggestion logically and given his feet prolonged and absolute rest. I frequently see patients with gonorrheal arthritis and periostitis, with spurs on the bottom of the os calcis and feet swollen and exquisitely painful, hobbling about with a cane or two, trying to keep at their occupations, when they readily admit that they are comparatively free from pain when the feet are at rest.

It is necessary to impress upon the patient that rest means absolute and prolonged relief from weight-bearing, and that if he steps on his feet even once a day, he thereby forfeits much of the benefit secured by twenty-four hours in bed. The reason for that is that when the painful, relaxed, inflamed tissues composing the supporting structure of the arches of the foot are once stretched out by the superimposed weight, it takes many hours for them to regain tonicity and contractile power to counteract the traumatism. I have found it so difficult to impress upon the patient that sitting around the house in slippers is not rest, in the full sense of the word, that I have adopted the plan of fixing

the feet in plaster of Paris or some dressing that prevents the patient's stepping. The duration of absolute rest necessarily will depend upon the amount of pain and tenderness and the degree of pronation and relaxation. It varies from a week to a month, and can only be learned by experience with all sorts of cases.

Supination. If we study the dissected foot we notice at once that the pronated position puts all the tissues supporting the longitudinal and transverse arches on the stretch, while supination relaxes the plantar structures and allows the tibial and flexor muscles, which are chiefly concerned in lifting the weight from the inside toward the outside of the foot, to contract.

As the calf muscles contract through the tendon Achillis and throw the weight forward, the tibials and long plantar muscles acting at the same time, tip the weight outward toward the outer border of the foot, to the toes. Active supination, therefore, is a natural part of a normal step. Any attempt to exercise the muscles of locomotion with the foot in the pronated position is not only awkward but soon becomes painful. Conversely, when the foot has become pronated and painful by some disturbance of its mechanism, the only position in which the weak and over-stretched tissues supporting the structure can regain their tonicity and power and undergo contraction is in supination. No matter what the degree of distortion nor whether it is static, traumatic or inflammatory in origin, if it is pronated it can never be cured or relieved of pain until it has been supinated.

Support. After the weak or pronated foot has been supinated it needs support. The character of the support and how long it will be needed depends upon the strength of the supporting structures and the amount of traumatism that has been required to supinate the foot. I find that when the great majority of practitioners are confronted by weak or painful feet or "broken arches" they think of foot plates or "arch supports." That is a great mistake, for a very large percentage of such cases do not need them and another large percentage could not wear them if they had them. The earlier and milder cases, whether static, toxemic or inflammatory in origin, can be more successfully treated without them, and the most severe cases, with rigidly pronated feet, cannot wear them. That leaves only the cases of moderate degree and the severe cases in which supination has been secured by force, in which they are useful.

It is my custom to first supinate all cases of painful feet of whatever character, using any means necessary, including tenotomies, osteotomies, excisions or osteoclasis, to get the foot into a supinated position. Then I enclose the foot in a comfortable plaster cast until the plantar tissues and supinator muscles have had a chance to contract, and all tenderness and pain have disappeared. In cases of simple weak foot, seven to ten days' rest, with the foot held in supination, will be all that is necessary, as preliminary preparation for support, while in severe, rigid cases requiring tenotomy, excision of a portion of the peroneals or scaphoidectomy, the foot may be kept in a plaster cast for two months.

Then comes the question of support. If it is simple weak foot a stout, straight-lasted, medium shank shoe with a modofied heel (Hugh Owen Thomas), may be all that is necessary. The heel must be made to measure for each case. Four measurements are required, viz.: the distance from the insertion of the tendo Achillis to the anterior border of the scaphoid; the distance from the insertion of the tendo Achillis to the anterior border of the external malleolus; the height of the heel on the outer border, the last measurement plus from ⅛ to ¼ inches to be the inner height of the heel. The height of the heel is a very important consideration. You cannot change from a very high heel to a very low one immediately. Frequently the patient is wearing too low a heel, thereby causing the stretching of the tendo Achillis, resulting in pain. In such cases raising the heel gives immediate relief.

The next group of cases, those with a little more trouble, require in addition to the modified heel, support of either longitudinal or transverse, or both, arches, which support can be easily supplied by cutting pads from resilient felt and sewing them to the under surface of a leather insole cut to fit the shoe. These pads pack down and after 5 to 15 days are reinforced.

In more severe cases plaster models are made of every foot to be treated. A baker's pan considerably larger than the foot, is half filled with lukewarm water and plaster of Paris is gradually and evenly dusted in. After sufficient plaster has been added and has taken up the water, the mixture is stirred until a perfect cream is pro-

duced. A small amount of table salt is dusted on and the mixture is stirred again. The patient sits on a chair on a platform with his hands under one knee to keep the leg and foot from moving. The most painful areas are marked on the foot with indelible pencil. Just as the plaster is about to set the foot is put in without exerting pressure. The plaster is brought up snugly against the inner border of the foot and in that position the plaster is allowed to set.

After a few minutes the foot is removed from the plaster by first abducting the leg at the knee. Do not allow the foot to remain in plaster too long and do not leave the patient with his foot in the plaster, as a burn might result from the heat developed by the reaction which takes place between the plaster, water and salt.

The plaster mold is allowed to dry and dusted with talcum, which should be rubbed in thoroughly. Some more plaster cream is prepared (but this time without salt), and poured into the mold. After several hours the mold is hammered off and a plaster model of the sick foot is obtained. The model is now ready to be "shaped." With a curved knife the model is trimmed. The knowledge of shaping a model can be obtained only by experience. A rigid foot can stand only very moderate changes, a flexible foot can be given a marked correction at the start. The model is then marked with indelible pencil and sent to the instrument maker with a notation as to the kind of metal to be used. The most satisfactory metal for foot plates is German silver of 18 to 20 gauge. In certain cases the support is made of metal and leather.

If the patient needs new shoes he should wait until his plates have been fitted. Let me add right here that the writer has shoes made to order for one patient in about 200. The plates must be fitted to the new shoes. They must be reshaped from time to time as the feet improve and as more support can be tolerated.

For patients who are not heavy and whose feet have reached the stage where the support does not have to be changed a celluloid plate which is very light may be used. It is made as follows: A sheet of thin leather is tacked smoothly to a plaster model. Then a creamy solution of celluloid in acetone is applied as a thin coat. A piece of gauze is laid on and when the celluloid is dry another coat with gauze is applied. Thin pieces of leather are used to build up the support either transverse, longitudinal or both, and many layers of celluloid put on as the under layers dry. Steel reinforcements may be inserted. The tacks are removed and the edges trimmed.

Exercise. In all except the most rigid cases, and in elderly patients, exercises to strengthen the flexor muscles of the leg and foot are necessary to complete the cure and enable the patient eventually to discard the artificial supports. Patients past 50 years of age and rigid cases which have required operation generally have to use supports of some sort continuously, though many of these improve sufficiently so that the support may be incorporated in a shoe that is made to order. The first exercise required of all patients is walking with toes turned in. It is a noteworthy observation that very few "pigeon toed" patients present themselves for treatment of arch trouble. The triangular heels, with or without a lift under the inner edge of the sole, compels them to toe in at first, but the necessity of cultivating that gait is impressed upon the patient, and they are required to practice it fifteen minutes morning and night in stocking feet or moccasins, until finally they do it unconsciously, when the lift on the sole can be abandoned.

A very valuable exercise is one done in four distinct counts. With feet parallel and about three inches apart,—the patient is instructed to: 1. Rise to toes. 2. Spread heels apart. 3. Bring heels back. 4. Bring heels down.

A supination board is valuable. It is an isosceles triangle base down and several feet long which the patient walks on.

The patient should be directed to give the feet a cold bath, followed by brisk rubbing, and with one leg crossed over the other to successively go through the following: 1. Extend the foot. 2. Supinate. 3. Flex in supination. 4. Return to starting point. This procedure should be done vigorously 25 times twice a day.

Massage and hydrotherapy to improve the circulation are useful. Gradually the patient is encouraged to lengthen his walks until finally he can get about all day with comfort.

In a young patient with active muscles and in milder cases these measures, if thoroughly carried out, will complete a cure in from six to twelve months. In cases due to infection, as for instance, teeth, tonsils, sinuses or gonorrhea, the primary or residual infection must, of course

be treated. If there is a toxemia developed from intestinal intoxication it must be stopped.

These patients do better on a diet free from meat, fish and eggs, and consisting chiefly of fruits, vegetables and cereals. Constipation must be treated when present.

In the rigid form of flat foot the treatment will necessarily begin with operative measures, for, as I have indicated, the foot must be supinated, and in order to do that tenotomy or rarely excision of the part of the peroneal tendons will be necessary, followed by forcible correction with a wrench or over a block. Excision of the scaphoid may be necessary.

In cases where pain is a very prominent factor a few days of absolute rest in bed, with the following lotion applied constantly, will be of great benefit.

Tincturæ Opii	30
Liq. Plumbi Subacetatis Dil	40
Tincturæ Arnicæ	50
Extracti Hamamelis	60

M. et ft. Lotio.

Sig.—Saturate gauze and apply, then hot wet-flannel dressings, oiled muslin and hot water bags. Turkish towel over all. Renew every three hours.

Rest in plaster casts is necessary for from two to three months, and the support will usually be worn permanently. The shoes should be modified so that the feet cannot again become pronated.

Gonorrheal Feet

Gonorrheal arthritis involving the tarsus has so many features of interest besides its casual relation to flat foot that it is worthy of special consideration. It is much more frequent than is commonly supposed; in fact, it is a frequent sequela of gonorrheal urethritis.

It usually develops during convalescence from the acute urethritis or during the chronic stage, and its onset is often so acute that its relation to the urethritis, which the patient considers practically cured and fails to mention, may be overlooked. The inflammation affects the periarticular structures and periosteum more than the articulations themselves, and the tissues supporting the tarsal arch become softened, boggy and relaxed, which accounts for the development of flat foot later.

One of the peculiarities of the disease is the predilection which it seems to have for the periosteum of the os calcis. In the chronic form the periosteum of the os calcis may be the only point of attack and the patient complains only of pain in the heel on walking. Tenderness is found all over the os calcis, but especially at the tubercle on the under surface of the bone and at the attachment of the tendo Achillis. If the inflammation persists, and especially if the patient continues to walk in spite of the pain, sharp, bony spurs (exostoses) develop at one or both of these points and the patient is finally unable to walk on account of the agonizing pain.

The roentgenogram reveals the true condition of affairs, and when these exostoses are present the only treatment is to chisel them off. This almost invariably results in a cure.

Of course, whether we are dealing with an acute general arthritis of the tarsus, a flat foot or a perostitis of the os calcis, all traces of gonococci in the urethral tract must be cured before the feet will get well.

It is not to be inferred from the foregoing that all cases of "painful heel," so-called, are gonorrheal, because the writer has seen many that were not, but the association is so frequent that one should always look for gonococci, especially in cases with spurs on the os calcis. Baer, of Johns Hopkins, has demonstrated gonococci in the periosteal scrapings from a large percentage of these cases. Along with the treatment outlined above for painful and flat feet, the use of gonococcus vaccines may be beneficial.

There are undoubted cases of painful heel due to autointoxication of intestinal origin, and to operate without giving the patient instructions concerning the limitation of meat, fish and egg intake would be poor treatment. When a patient has a spur on one os calcis investigate the other very thoroughly, because he might return a year after operation with a spur on the other. Syphilis may cause these exostoses of the os calcis.

Morton's Metatarsalgia

This is a cramp-like, exceedingly painful affection of one or more of the metatarso-phalangeal joints. It occurs only in adults, and in women more often than in men. The pain comes on suddenly, and almost invariably when the patient has her shoes on. It is described as cramp-like and excruciating, often radiating along the foot and up the leg. The patient has to sit down at once, remove the shoe and rub and squeeze the front of the foot and work the toes, usually with relief. The attacks may occur

at long intervals or may be so frequent as to disable the patient. The trouble is caused by the flattening or relaxations of the anterior or transverse arch of the foot when compressed by the shoe, so that the ball has not room to spread (analogous to the pain produced in the hand by squeezing the metacarpophalangeal joints when relaxed). Third and fourth joints are most often the seat of the pain.

The fact that this affection occurs predominantly in women (I have never seen a case in a child and but very few cases in men), and while wearing shoes, convinced me long ago that the peculiar vanity of the sex, which leads them to crowd the foot into a shoe which is so narrow that it cannot allow for the natural expansion of the transverse arch when the weight falls upon the ball of the foot, is the chief cause of the trouble. This indictment can be brought especially against narrow shoes with high heels, in the wearing of which the weight must necessarily be borne by the metatarsal heads most of the time.

The treatment is indicated very plainly by an understanding of the etiology and pathology. The transverse arch must be restored and held there with the foot supinated to relax the plantar tissues, until all soreness is gone; then the arch must be supported by some device which prevents falling of the metatarsal heads, in a shoe which will allow natural expansion of the ball of the foot. A specially cut felt pad sewed to the bottom of a leather insole or a metal support for the transverse arch will relieve the trouble, and with the aid of the exercises given below and correction of the cause will usually affect a cure.

For the accompanying callouses the following will be found of benefit:

Acidi Salicylici.....gr. xxx
Fletracti Cannabis Indicæ.....gr. xx
Flex. collodion.....drachm ss

M. et. ft. sol.

Sig.—Apply externally with camel's hair brush three times a day for several days, then soak in hot water.

If a piece of felt cut like a life preserver is secured so that the callous is under the hole relief will be affected more quickly.

Special stress should be laid upon the patient's never stepping for many months, except when wearing the shoes and support. They should be put on before getting out of bed and taken off the last thing before getting in, because one recurrence may undo the benefit of months of treatment.

Exercises: 1. The patient should practice curling the toes downward as though grasping something. 2. She should put her foot against a corner of a chair and press the anterior portion against it 25 times, twice a day. 3. She should get a number of different sized marbles and practice picking them up from the floor with her toes. Ten or fifteen years ago it was thought necessary to excise the head of the offending metatarsal bone, but that mutilates the shape of the foot and is unnecessary.

Arterio-Sclerosis of the Vessels of the Foot

This is a variety of painful feet which belongs in a class by itself. It usually occurs in older people and is associated with arterial degeneration, and is undoubtedly caused by sclerosis of the smaller vessels of the feet. It is the most obstinate and hopeless type of painful feet. The feet look normal except that they are usually blue or purple and cold. The pain may be intense and is relieved by nothing but rest and elevation. These patients frequently say they are never free from pain except when lying down. There is usually high blood pressure, with high diastolic pressure and other signs of arterial degeneration. The prognosis is bad. The treatment of the general condition is very important. Circulatory tonics, vasodilators, Donovan's solution, etc., are to be tried. For the local burning or itching the following is recommended:

Ichthyolis 40
Glycerini 10
Aq. Destillatæ 50

M. et ft. sol.

Sig.—Apply with brush three times a day.

The treatment of the feet consists of padded insoles or plates, giving very gradual support, elastic bandaging or elastic stocking.

Differentiation of tubercular disease of the tarsus from other forms of painful feet may be necessary. This should not be difficult when we carry clearly in mind the clinical picture of tuberculosis: 1. The diffuse swelling, extending even to the plantar tissues. 2. The induration, due to the characteristic tubercular exudate. 3. The tendency to abscess formation along with the evidence of destructive disease. 4. Pain and muscular contraction on attempted motion. These signs and symptoms make up

(Continued on page 128.)

ILLINOIS MEDICAL JOURNAL

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Contributors will submit all copy for publication typewritten on standard size paper and double spaced. Copy not complying with this rule will be returned, if convenient.

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State society will pay no bills for legal services except those contracted by the committee. Notify the Chairman at once. Don't employ attorneys.

FEBRUARY, 1917

Editorials

CHANGE OF DATE—ANNUAL MEETING AT BLOOMINGTON—ONE WEEK EARLIER

A circumstance has arisen over which the President, the Council nor the Committee of Arrangements had no control, which, unfortunately, makes it imperative that the date of the Annual Meeting be changed. The President, with the concurrence of the Council, has set the date of the Annual Meeting one week earlier—May 8, 9 and 10.

We hope this will make no material difference with the attendance, and that particularly those members reading papers will be able to attend.

NOTICE.

The by-laws provide that all members in arrears on Dec. 31st of any current year shall be dropped from membership. Accordingly some 500 members of the Illinois State Medical Society will not receive their February JOURNAL and will not be protected by the Medicolegal Committee in case of malpractice until they have been reinstated.

If you are not sure of your standing in your county society, please take the matter up with your secretary and see that he gets busy at once.

W. H. GILMORE, Secretary.

HEALTH INSURANCE.

There seems to be no let up on the agitation of compulsory health insurance. There does seem to be a little less assurance that it is wanted in America. In fact, no one seems to be quite positive that it is a necessity except the "welfare" workers. Mr. Gompers of the Federation of Labor does not seem to think it necessary, and does think it has dangers even for the workmen whom it is designed to benefit.

The idea seems to have originated in Europe, and does not seem to have been either popular or beneficial there, if we can rely on those who have witnessed its workings across the water. Yet there seems to be a very strong effort to force it upon us here, by those societies that are interested in the enactment of the so-called model health bill.

With all the agitation upon this subject during the last year, but few seem to know just what it means or what it will include, and few, if any, aside from the large employers of labor, seem to understand that it will be another burden for the taxpayer, as it is designed that at least 20 per cent. of the cost will come from the general tax fund. The farmers, the small business men, the professional men, who are not employers of labor and who are in no manner benefited, will pay at least 20 per cent. of the burden.

The proposed bill is so complex and difficult of understanding that few have really gone into its provisions. The medical provisions, or at least the medical fee table, so far as we know, has not yet been written into the bill, and those interested are not inclined to talk much on this feature.

We feel that the underlying principle is paternalism, originated by that class of organizers who have been interested in other charities (so-called). Paternalism and pauperism are very closely associated in our mind. In fact, there can be no excuse for one without the other. The United

States is not the home of either, and we feel neither should be tolerated in a free liberty-loving republic.

The medical profession is interested because it must bear a large portion of the burden, and it must have something to say as to what the recompense shall be. In Europe the medical profession was asked to carry the medical portion of the health insurance load for a recompense that was a mere beggarly pittance. The medical profession of this country is already loaded with charities, and must not assume another of such vast proportions, simply to enrich the coffers of the large corporations employing labor, or the insurance cmpanies.

If this country must be the guardian of its laborers and there must be a compulsory health bill, let it be a fair one at least, and place the taxation where it belongs. If there must be a compulsory health bill, let there be a corresponding fee bill, and let the profession say what it will be paid. It would seem to us that if the laborers were paid a wage sufficient for the respectable maintenance of their families, and sufficient for the education of their families into good citizenship, it would prove unnecessary for them to become wards of the state.

We believe the so-called model compulsory health insurance bill is objectionable from many standpoints, objectionable to the medical profession, objectionable to those who would come under its compulsory insurance clauses, objectionable to that large body of taxpayers who, being taxed to maintain it, still will not be in any way benefited. Neither do we believe that society will be benefited by a law which creates paternalism.

IS CANCER HEREDITARY OR CONTAGIOUS?

We have had occasion several times to quote statistics from life insurance companies. Life insurance companies are vitally interested in mortality statistics, and we are indebted to them for much data which is very valuable, and which includes both the data from their medical departments and from their actuaries.

Mr. Arthur Hunter, who is now actuary for the New York Life Insurance Company, has undertaken to determine if the data of several large insurance companies would indicate heredity in cancer. This study was undertaken largely because census reports indicate an increase of the death rate from cancer of about 30 per cent in fifteen years, and because life insurance mortality reports have shown cancer to be the third most important cause of death among men at ages over forty-four, and the leading cause of death among women of corresponding ages. This seems alarming, but, no doubt, some of the apparent increase in deaths from cancer is due to a more correct diagnosis than formerly, and also to a more complete reporting of deaths and causes of death.

Mr. Hunter thinks that a study of many thousands of cases does not indicate heredity or contagiousness, and that there is no ground for believing that either is a factor in cancer. In a group of 20,000 applicants, it was found that in 488 cases one parent only had died from cancer, while in four cases both parents had died of cancer. Of these 488 cases, where one parent only had died of cancer, in 100 cases, or 20 per cent, the other parent had also died, but of other causes and at an average age of 13 years younger than the parent who died of cancer. In 115 cases, or 24 per cent, the other parent had also died from other causes at an average age of 14 years older than the parent who died of cancer. In 273 cases, or 56 per cent, the other parent was living and was not cancerous. The average of these 273 was 5½ years greater than the age at death of the 273 parents who had died of cancer.

Mr. Hunter says, "The significant fact in this investigation is that there were only four cases out of the 20,000 applicants in which both parents died of cancer."

Another group where both parents had died of cancer prior to date of application for insurance gave the following data:

Of 472 grandparents of these cases, the cause of death was given in 234 cases of which only 2 were from cancer. In 184, the cause of death was stated as "old age," the average age at death of which was 82. In 72 of these grandparents, the cause of death was not known, but the average age was 62.

A synopsis of these cases follows:

472 Grandparents.

Deaths from:	
Known causes (including old age)	233
Cancer	2
Unknown causes	227
Living	11

236 Parents, all died of cancer.
314 Sons and Daughters.

Above age 40—Death from:

Known causes	27
Cancer	0
Living	287

Above age 50—Deaths from:

Known causes	12
Cancer	0
Living	187

301 Brothers and Sisters of Parents.

Deaths from:

Known causes	200
Cancer	9
Unknown causes	27
Living	74

Several other groups were selected and the family histories traced as far as possible with similar conclusions.

In the conclusion of his paper, Mr. Hunter states: "It would be rash to state that the low percentage of deaths from cancer among the groups of those with a family history of that disease was an indication of resulting immunity. * * * Certainly the statistics show that a man or a woman, one or both of whose parents died from cancer, is no more likely to die from that disease than those whose family history was free from that blemish."

NEW AMSTERDAM CASUALTY COMPANY.
SURETY-CASUALTY.

59 John St., New York City.

7 St. Paul St., Baltimore, Md.

George H. Nickels, Claim Adjuster, 175 W. Jackson Blvd., Chicago, Ill.

To Our Policy Holders.

Kindly disregard instructions and list of surgeons formerly sent you.

We have appointed Dr. Orlando F. Scott, Chief Surgeon of the Company, who has service stations throughout the city of Chicago, in charge of competent doctors, day and night. In addition to this the doctor has made arrangements for injured employes with the best hospitals.

In case of accident to an employe in course of his employment, no matter how slight the injury may be, call Dr. Scott's main station, Lawndale 4968, and he will immediately arrange for the necessary medical attention.

Please have our medical arrangement explained thoroughly to all your employes in all languages as may be necessary, and kindly instruct your superintendents and foremen to see that this is done.

Please instruct your superintendents and foremen to impress upon your employes the fact that if they do not accept Doctor Scott or a physician recommended by him, we will refuse to pay for any part of the medical attention.

Your co-operation in this matter will undoubtedly prove beneficial in holding your premium to the minimum.

Kindly acknowledge receipt of our letter on the enclosed card.

We should be glad to have you or your representative visit any of Dr. Scott's stations.

Very truly yours,

NEW AMSTERDAM CASUALTY COMPANY,

Chicago Office, 1047 Insurance Exchange Bldg.
Telephone, Wabash 1656.

* * *

It would be difficult to find a better reason for opposing compulsory health insurance than the above letter sent out by this insurance company. A physician cannot well serve the insurance company and the sick public.

Illinois is one of the states which had the joker written into its workman's compensation act, under which an insurance company can force any contract practice man upon workmen, no difference who he may be or how incompetent. They also select the best (?) hospitals.

Our legislative committee might take the opportunity to propose an amendment to the Illinois law.

MALPRACTICE CLAIMS CONSEQUENT UPON TREATMENT OF FRACTURES.

R. J. FOLONIE,

CHICAGO.

Actions for claimed malpractice until the last few years were based in greater part upon treatments of fractures. During the last five years the proportion of cases consequent upon treatment of fractures has been slightly less, due to an increase of claims upon cases of obstetrical attendance, operations claimed to have been performed without consent of the patients, etc. The nature of the claims seems to proceed somewhat in cycles, their existence often being predicated upon some favorable verdict for a patient, which gives rise to a series of cases based upon hopes of a like result. My experience leads me to believe that during the next five years there will be a recrudescence of claims in fracture cases based upon mistaken diagnosis or failure to put fractured parts into correct apposition, basing the claim of negligence upon failure to resort to x-ray examination. A consensus of lay and judicial opinion is rapidly forming, censuring a physician for failure to make a fluoroscopic ex-

amination or have a plate made, and I anticipate that greater and greater strictness will be observed by the courts in imposing this obligation upon the attending physician. The tendency is not only to require a plate or fluoroscopic examination in making diagnosis, but also to require such examinations from time to time in the progress of the treatment to determine that proper apposition exists, and that the means taken are in fact progressing effectually to a desirable result. The excuse which has proven reasonably effectual in the past, that the physician did not have a machine available, will be looked upon with less and less favor, and I anticipate that eventually there will be a holding that a physician who does not have a machine himself, or secure the use of one, will be held to be incompletely equipped for the proper care and treatment of the injuries here under discussion. There has been a determination of one case in this state, where the liability was imposed upon a physician because of failure to have a plate made (the result proving unfortunate), and while the court places its opinion upon testimony that a request was made upon the physician to have a plate made, which he refused, it is not unreasonable to expect that a broader ruling will be made in another case, finding liability for failure to secure x-ray examination, even in the absence of a request from the patient. The rule of the law is that a physician must use ordinary care, "having in consideration the advanced state of his profession at the time." The dissemination of wider knowledge on the subject among the laity and the profession is creative of a condition whereby the physician is being forced to the use of this means of knowledge, as much for his own protection as for the benefit of the patient. Mistakes of diagnosis in cases of impacted fractures of the neck of the femur, Pott's fracture, etc., have been repeatedly excused in the past because of the difficulty of diagnosis (or rather ease of a mistake of diagnosis), and the physicians have been repeatedly discharged from responsibility where the reduction of a Colles' fracture was not properly accomplished. The difficulties attendant upon a successful defense of claims of patients in these cases are being daily enhanced, and will in the near future become almost insuperable. I strongly urge upon the profession a freer resort to examinations through the x-ray as calculated to minimize their tribulations.

SYMPOSIUM ON THE MEDICAL PROFESSION.

The Medical Review of Reviews, 206 Broadway, New York City, published in its January issue a "Symposium on the Medical Profession." For many years it has been more or less the custom to make sarcastic remarks concerning the medical profession and to belittle the work which it is doing. The Review has taken upon itself the task of getting in touch with many of the most prominent lay men and women of the world, and to learn from them their opinions concerning the medical profession of today.

"What's the matter with the doctor?" is the question that was propounded, and replies have been received from such men as Andrew Carnegie, John Wanamaker, Nathan Straus, Theodore N. Vail; from such authors as Jerome K. Jerome, Israel Zangwill, the Princess Troubetzkoy, William Dean Howells, Gertrude Atherton, Robert W. Chambers, Alice Hegan Rice, Margaret Deland, Theodore Dreiser, George W. Cable, Julian Hawthorne, Ellis Parker Butler, Bruno Lessing, Booth Tarkington, George Kennan, Ernest Thompson-Seton; from such poets as Edith M. Thomas, Bliss Carman, Rose Hartwick Thorpe, Wallace Irwin, Witter Bynner, John Kendrick Bangs (these last two contributions being in verse); from such folks of the stage as Minnie Maddern Fiske, Wilton Lackaye, James K. Hackett, William C. de Mille, Charles Rann Kennedy, Eugene Walter, John Philip Sousa; from such educators as Andrew D. White, David Starr Jordan, E. Benjamin Andrews, the late Booker T. Washington, Charles F. Thwing; from such inventors as Nikola Tesla and Hudson Maxim; and from editors, politicians, cartoonists, theologians, et al., throughout the world.

We believe this symposium will prove interesting, and if properly distributed may prove of distinct benefit to the profession.

LUTHER D. BRADLEY, CARTOONIST.

We will miss the familiar line that has appeared so often, "By courtesy of Mr. Bradley," under the excellent cartoons that we have published in the JOURNAL. Clean, kindly, uplifting, his cartoons reflected his character and portrayed a mastery of artistic technique that placed him in the front rank of his profession. It is not generally known that, though an American of New

England lineage, he first attained fame through his cartoons in Melbourne, Australia. This gave him a wide reputation throughout the English-speaking world.

As an illustration of the difficulties that beset the choice of subjects, Mr. Bradley related to the writer an incident that caused him some embarrassment. He had purposely taken an almost impossible name for the subject of one of his comic pictures, but when it appeared an outraged individual stormed into his office brandishing the cartoon and claiming that he was libeled, and his friends were making life miserable for him. The picture was a good likeness of the aggrieved party with the "impossible" name!

The *Chicago Daily News* will publish a volume of selected cartoons by Mr. Bradley, printed by Rand, McNally & Co., bound in cloth and on high grade paper. It is intended as a memorial and in spite of the cost will be sold at $1 the copy. It may be a good investment for the table in the physician's reception room. The volume is to appear February 15.

TO THE WOMEN PHYSICIANS OF ILLINOIS.

A very cordial invitation is extended to you to spend the week of February 12 to 16 in Chicago and attend the clinics and entertainments which we are planning for our professional sisters.

If you can come and spend a few days with us we should be very glad to become better acquainted and to make your visit pleasant and profitable. Will you kindly advise Dr. Edith B. Lowry, 32 North State street, Randolph 345, chairman of the Hospitality Committee, when we may expect you.

We anticipate a happy time in the renewal of old friendships and the making of new ones.

Headquarters have been established at the College Club Rooms, Stevens building, 16 North Wabash avenue, where mail, telegrams, etc., may be sent, and bulletins will be posted daily as regards extra clinics, entertainments, etc. Members of the Reception Committee will be in attendance each day.

Fraternally yours
THE MEDICAL WOMEN OF CHICAGO.

PARTIAL SCHEDULE FOR CLINICAL WEEK.

Monday, February 12, 1917.

Nose and Throat.....Dr. Katherine Rich, 8 a. m.
Tabitha Hospital, Francisco and Cortez Sts.
Ear, Nose and Throat.....
.....Dr. Adelaide Duncan, 2 to 4 p. m.
Post Graduate Hospital
Gynecology.....Dr. Ida Bostick, 2:30 p. m.
Hahnemann Hospital, 2814 Ellis Ave.
Nose and Throat.....Dr. Ione Beem, 3 to 5 p. m.
Chicago Eye, Ear Hospital, 235 W. Washington St.
Surgery.....Dr. Ethel Rice, 8 a. m.
German American Hospital
X-Ray....Miss Alma H. Brindley, 9 to 11 and 1 to 4
Wesley Hospital, 24th and Dearborn Sts.
Operative Nose and Throat.....
.....Dr. Lillian Taylor, 3 to 5 p. m.
Mary Thompson Hospital

Tuesday, February 13, 1917

Operative Gynecology.....
.....Dr. Bertha Van Hoosen, 8 to 12 a. m.
Cook County Hospital, Wood and Harrison Sts.
Operative Gynecology.....
.....Dr. Mary Kearsley, 8 to 12 a. m.
Mary Thompson Hospital, Adams and Paulina Sts.
Anaesthesia.....Dr. Josephine McCollum, 8 to 12 a. m.
Mary Thompson Hospital, Adams and Paulina Sts.
Eye.....Dr. Adelaide Duncan, 9 to 11 a. m.
Post Graduate Hospital, 24th and Dearborn Sts.
Medicine .....Dr. Armina Hill, Op., 10 to 12 a. m.
Mary Thompson Hospital, Adams and Paulina Sts.
Nose, Throat and Ear..Dr. Lillian Taylor, 3 to 5 p. m.
Mary Thompson Hospital, Adams and Paulina Sts.
X-Ray .....
....Miss Alma H. Brindley, 9 to 11 and 1 to 4 p. m.
Wesley Hospital
Gynecology and Obstetrics.....
.....Dr. Clara Ferguson, 3 to 5 p. m.
Mary Thompson Hospital
Visit to Hull House and Tea, 3 p. m.
Dr. Rachelle S. Yarros

Wednesday, February 14, 1917

Operative Gynecology.....
.....Dr. Bertha Van Hoosen, 8 to 12
Mary Thompson Hospital
Anaesthesia.....Dr. Josephine McCollum, 8 to 12
Mary Thompson Hospital
Surgery.....Dr. Ethel Rice, 8 a. m.
Columbus Hospital
Operative Gynecology....Dr. Julia Strawn, 9:30 a. m.
Hahnemann Hospital, 2814 Ellis Ave.
Bacteriology.....Dr. Ruth Tunicliffe, 10 a. m.
Memorial Institute for Infectious Diseases,
Harrison and Wood Sts.
Diagnostic Gynecology.....
.....Dr. Julia Strawn and Dr. Lillian Thompson
Hahnemann Hospital
Pediatrics.....Dr. May Micheal, 1 to 3 p. m.
Mary Thompson Hospital
Nose and Throat....Dr. Adelaide Duncan, 2 to 4 p. m.
Post Graduate Hospital
Eye.....Dr. Ione Beem, 2 to 3 p. m.
Chicago Eye and Ear Hospital
Tuberculosis.....Dr. Katherine Rich, 3 to 5 p. m.
Municipal Tuberculosis Dispensary,
Ashland and Blackhawk St.
X-Ray.....Miss Alma H. Brindley, 9 to 11 and 1 to 4
Wesley Hospital
Intravenous Administration of Salvarsan and the
Making of Autogenous Vaccines.....4 to 6 p. m.
National Pathological Laboratory,
5 South Wabash Ave.

Medical Women's Club Banquet.....6 to 8 p. m.
College Club Rooms
Guests of Honor: Dr. Adah McMahan, LaFayette, Ind.; Dr. Laura H. Brandon, Iowa City, Iowa

Program Chicago Medical Society Meeting, 8 p. m.
Marshall Field Annex
Pain and Vomiting in Biliary Tract Infections....
.....Dr. Charles Louis Mix
Discussion: Dr. Joseph A. Catts, Dr. L. L. McArthur, Dr. T. A. Davis
The Psychoses of Adolescence.....
.....Dr. Harriet C. B. Alexander
Discussion: Dr. Chester H. Keogh
Tumors of the Breast.....Dr. Frederic A. Besley
Discussion: Dr. Harry M. Richter

Thursday, February 15, 1917

Operative Gynecology. Dr. Mary McEwen, 9 to 11 a. m.
University of Illinois, Congress and Honore Sts.
Diseases of the Gums.....
.....Dr. E. Mary Lohmann, 10 to 11 a. m.
University of Illinois
X-Ray.....Miss Alma H. Brindley, 9 to 11 and 1 to 4
Wesley Hospital
Electro-Therapeutics. Dr. May Cushman Rice, 10 to 12
Illinois School of Electro-Therepautics,
30 East Randolph St.
Surgery.....Dr. Alice Conklin, 2 p. m.
Norwegian Tabitha Hospital
Children's Diseases.....Dr. Grace Campbell, 2 p. m.
Tabitha Hospital
Gynecology.....Dr. Mary Hanks, 2:30 p. m.
Hahnemann Hospital
Medical.....
Dr. Blockwood and Dr. Lillian Thompson, 2:30 p. m.
Hahnemann Hospital
Obstetrics.....Dr. Rachelle Yarros, 3 to 4 p. m.
Chicago Lying-In Hospital
Nose and Throat.....Dr. Ione Beem, 3 to 5 p. m.
Chicago Eye and Ear Hospital
Operative Gynecology..Dr. Alice Conklin, 3 to 5 p. m.
Tabitha Hospital
Physiologic Therapeutics.....
.....Dr. Lena K. Sadler, 4 to 6 p. m.
Institute of Physiologic Therapeutics
32 North State St., Room 300
Psychopathic Hospital.....Court session, 10 to 12
Judge T. F. Scully
Stock Yards, 2 o'clock Luncheon, Inspection of Armour Plant

Friday, February 16, 1917

Operative Gynecology.....
.....Dr. Bertha Van Hoosen, 8 to 12
Cook County Hospital
Operative Gynecology....Dr. Julia Strawn, 8:30 a. m.
Hahnemann Hospital
Pediatrics .....
Dr. Cobb, Dr. Adelaide Hoeeffel and Dr. Agnes Fuller
Hahnemann Hospital
Operative Gynecology....Dr. Clara Seippel, 8:10 a. m.
Wesley Hospital, 24th and Dearborn Sts.
X-Ray....Miss Alma H. Brindley, 9 to 11 and 1 to 4
Wesley Hospital
Gynecology and Obstetrics.....
.....Dr. Clara Ferguson, 3 to 5 p. m.
Mary Thompson Hospital
Operative Nose and Throat.....
.....Dr. Lillian Taylor, 3 to 5 p. m.
Mary Thompson Hospital
Twilight Sleep Clinic.....Dr. Clara Ferguson
Mary Thompson Hospital

Saturday, February 17, 1917

Municipal Tuberculosis Sanitarium, 10 a. m. Luncheon and Inspection of Institution

Dr. Jennie B. Clark will entertain the visiting women at dinner at the College Club, Wednesday evening, Feb. 14, at 6 o'clock.

Correspondence

Feb. 2, 1917.

Hon. Jno. A. Richert, Chairman Finance Committee, City Council, City Hall, Chicago, Ill.

Dear Sir: I am in receipt of a form letter from Dr. C. P. Caldwell relative to Diagnostic Stations in various parts of the city in connection with the Chicago Municipal Tuberculosis Sanitarium.

Any effort directed toward the relief of this dread malady free of cost to the poor of our city meets with my hearty approval.

However, I note that this letter states, "While these stations are primarily for the poor they will be conducted in such a manner as not to pauperize any patient."

If the services of these stations are to be indiscriminately rendered to rich and poor alike, I cannot help but feel that it is a gross error and very unfair to us as members of the medical profession, when the best years of our lives have been spent developing various diagnostic laboratories and have, as in my case, their all invested in this line.

It seems to me a great injustice for the city of Chicago to do this work free and thereby take away a large part of our income derived from those who are able to pay for our services and ultimately pauperize us.

I believe that if these stations are opened to the public without suitable restrictions, they will be greatly abused and differential diagnosis will call for skiagraphs of any condition or part of the body.

In fairness to those of us who would be affected in the legitimate pursuit of our calling, I ask that you use your influence to prevent the

abuse of this privilege by those who are in a position to pay for this service.

Very respectfully,

J. H. CARPENTER, M. D.

PITUITRIN IN TWO STRENGTHS.

The pituitary extract, formerly known as "Pituitrin" and supplied in ampoules, will hereafter be designated "Pituitrin O." A second preparation of the pituitary gland, bearing the title of "Pituitrin S," is now announced. Pituitrin S is approximately twice the strength of Pituitrin O. Both products are manufactured by Parke, Davis & Co.

Pituitrin O (obstetrical) is intended primarily for use in delayed parturition due to uterine inertia. It has been called "an indispensable item in the armamentarium of the obstetrician."

Pituitrin S (surgical) is indicated specifically in the treatment of post-operative intestinal paresis, vesical atony, hemorrhage, shock, etc. It is of the utmost utility in the hands of the surgeon and internist.

Pituitrin O is supplied in ampoules of 1 mil (1 Cc.), and ½ mil (½ Cc.). Pituitrin S is supplied in ampoules of 1 mil (1 Cc.) only.

Public Health

POLIOMYELITIS CONFERENCES.

STATE BOARD OF HEALTH INAUGURATES IMPORTANT SERVICE—GOVERNOR LOWDEN TO OPEN CONFERENCE IN SPRINGFIELD.

Probably the most important service ever rendered by the Illinois State Board of Health is being inaugurated in a series of clinical conferences and meetings for the purpose of overcoming the serious consequences of the prevalence of infantile paralysis during the past year, and in preventing an epidemic of this disease which may reasonably be anticipated in Illinois during 1917.

Beginning at Atwood January 31, 1917, these conferences and meetings will be held in 28 Illinois cities and towns with an itinerary so arranged that every community in which the disease prevailed last year will be reached.

During 1916 there were at least 1,000 cases of infantile paralysis in Illinois, leaving behind them hundreds of children who will suffer permanent paralysis or most distressing deformity unless they receive that form of scientific treatment such as has been developed within the past few years. With such treatment there is reason to anticipate that the vast majority of these unfortunates will be restored to useful lives.

Recognizing the urgent need for this treatment, the state board of health selected one of its most competent medical officers and sent him east to study the methods being employed in overcoming the damage left in the wake of the New York epidemic of infantile paralysis of last summer, and a program was arranged so that this special information might be taken into every section of Illinois.

One of the first official acts of Governor Frank O. Lowden in assuming office at Springfield was the endorsement of this program, in which both the Governor and Mrs. Lowden had manifested the keenest interest. This interest is shown by the fact that the governor will personally open at least one of the conferences and will keep in touch with all that are held.

In each of the 28 communities the program will consist of a clinical conference with physicians to be held both morning and afternoon, to which the members of the medical profession are invited to bring the children who have suffered from infantile paralysis and who, as a result, have become paralyzed or crippled. In the evening a public meeting will be held in which the attention of the people will be called to the fact that Illinois has every reason to anticipate a serious epidemic of infantile paralysis during 1917, that this may be prevented or its extent reduced by a broad campaign of education, while the pitiful after-effects of the disease may be minimized by early scientific treatment.

The clinical meetings will be held under the auspices of the county medical societies of the various communities, while the mayors and health officers are co-operating to make the public meetings distinctly successful.

The State Board of Health has the name of every physician who attended a case of infantile paralysis during the past year and personal letters have been sent to such physicians asking their co-operation in these community conferences. The response has been more than gratifying, while the disposition of mayors, health officers and county medical societies to encourage the work indicates clearly the general recognition of its importance. The campaign, incidentally, has the strong endorsement of the most prominent orthopedic surgeons of the middle west, who declared that with our newer and better methods of treatment much of the suffering and disability

following in the wake of infantile paralysis may be overcome.

One of the pathetic features of this campaign has been the large number of letters received by the State Board of Health from persons who are crippled or paralyzed from infantile paralysis suffered in years past. They write to inquire if they too may avail themselves of these clinical conferences, and while their chances of recovery are not as bright as in the more recent cases, it is believed that scientific treatment, even with these of long standing, will not be without beneficial result.

In Chicago the treatment of sufferers from poliomyelitis will be left to an organization recently formed and headed by Dr. Henry Bascom Thomas and Dr. Ludvig Hektoen, but the State Board of Health will interest itself in the residents of Cook county outside of Chicago, a clinical conference for these patients to be held in Chicago for March 8 to 13.

The first meeting is to be held at Atwood with co-operation of physicians from a part of Piatt county and from Moultrie and Douglas counties, in which there have been 16 cases of infantile paralysis during the past year. In Decatur, February 1 to 3, there will be a conference for DeWitt, Macon, Christian, Logan and Shelby counties, and a part of Moultrie county. In this district there have been 46 cases.

The next meeting at Mattoon February 5 and 6, and this is designed for the 19 cases in Coles, Edgar, Douglas and Effingham counties and parts of Cumberland and Moultrie counties. A meeting for Lawrence, Richland, Clay, Wayne, Edwards and Wabash counties and parts of Crawford and White counties, in which there have been 6 cases, will be held at Olney, February 8 and 9.

On February 10 there will begin a three-day conference at Harrisburg for the counties of Saline, Gallatin, Hamilton, Hardin, Pope, Massac and Johnson counties and part of White county, in which there have been 4 cases of infantile paralysis.

Cairo will be visited on February 13 with a conference for Alexander, Pulaski and Union counties and parts of Williamson, Johnson, Massac, Pope, Hardin and Jackson counties. This district has had six cases of the disease. At Benton on February 14 the counties of Franklin and Jefferson and parts of Williamson, Jackson and Perry counties will be represented with 6 cases.

One of the most important conferences will be held at East St. Louis February 15 to 17, reaching the counties of St. Clair, Madison, Bond, Fayette, Clinton, Marion, Washington, Randolph and Monroe and parts of Perry, Greene, Jersey, Macoupin and Montgomery, in which there have been 38 cases. On February 19 a conference will be held at Quincy for Adams county and parts of Hancock, Brown, Pike and Schuyler, with 8 cases.

The three-day meeting at Springfield, beginning February 20, will be opened by Governor Lowden. This section, in which there have been 18 cases, is made up of Greene, Cass, Menard, Scott, Logan and Sangamon counties, a part of Mason, Schuyler, Brown, Calhoun, Christian and Montgomery and Pike counties.

On February 23 there will be a meeting at Galesburg extending over three days to reach the counties of Knox, Warren, Henderson and McDonough and parts of Hancock and Fulton counties, in which there have been 19 cases.

Henry, Stark and Bureau counties, with 12 cases, will be reached by a meeting to be held at Kewanee February 27.

La Salle county is the only one in which more than one conference will be held. On February 28 a three-day conference will be held at La Salle, reaching parts of La Salle, Bureau and Putnam counties, having 21 cases, while another conference will be held in Ottawa on March 2, covering another section of La Salle county, in which 18 cases have occurred.

The largest number of cases in the state is represented at the three-day conference, to be held in Streator, beginning March 3, covering the remainder of La Salle county and Marshall, Livingston, Ford and parts of Grundy and Putnam counties. There have been 56 cases in this district.

A conference at Joliet on March 7 will reach Will and parts of Grundy and Kendall counties, with 4 cases.

The conference to be held in Chicago beginning March 8 and lasting five days, will reach that part of Cook county lying outside the city, together with DuPage and Lake counties and a part of Will county, a territory which has had

38 cases of poliomyelitis. March 14 and 15 Rock Island, Whiteside and Mercer and parts of Henry and Bureau counties, with 17 cases, will be reached by a conference in the city of Rock Island.

At Freeport on March 16 the counties of Jo Daviess and Stephenson and parts of Carroll and Winnebago counties, with 9 cases, will be represented.

Ogle county and part of Lee and Carroll counties are to be reached by a meeting at Oregon on March 17. There have been 13 cases in this district.

The Rockford meeting on March 19 will deal with 8 cases in Boone county and in parts of Winnebago and McHenry counties.

Four days will be given to a conference at Geneva, representing Kane county and parts of McHenry and DeKalb and Lee counties, in which there have been 23 cases.

Kankakee and a part of Will, Grundy, Iroquois and Ford counties, with 11 cases, will be the center of a conference at Kankakee on March 24.

A meeting at Champaign on March 26 and 27 will deal with Vermilion county and parts of Ford, Iroquois and Piatt counties, in which there have been 17 cases.

The last two meetings of the campaign will be held in Bloomington and Peoria. The former will be held March 28 and 29, dealing with McLean county and parts of Ford, DeWitt, Woodford and Logan counties, with 15 cases.

The Peoria meeting on March 30 and 31 has been arranged for the counties of Peoria and Tazewell and parts of Mason, Woodford, Stark, Marshall and Fulton counties. There have been 22 cases in this district.

T. B. NOTES.

Many patients are given stomach remedies when they need tuberculosis treatment. Every patient with gastric symptoms should be examined for tuberculosis.

If a fee is charged for an examination, that examination should be done to the best of our ability, and fewer cases of incipient tuberculosis would escape us. (Two hundred cases of pulmonary tuberculosis had consulted 451 physicians, and in 14.2 per cent. of all the consultations, no physical examination was made.—*Ohio State Journal, Dec., 1916.*)

An arrested case of tuberculosis on returning to work should preferably return to his former occupation, unless this occupation in itself is a predisposing factor of the disease. Telling arrested cases, previously employed in indoor occupation, to seek outdoor work is not always the best advice, as they may not be able to withstand the hardships incident to most of these occupations.—*Ford, Med. Record, Jan. 30, 1916.*

The only danger of not making a diagnosis of tuberculosis early is that the patient will die, but before dying he will infect others.

Points of Attack of Tb.—According to Kober, infection by inhalation is the most frequent method. The germs may be propelled into the atmopshere by talking, coughing or sneezing. The dangerous zone about a patient with Tb. extends three feet in every direction. The most frequent way is to incorporate the bacilli through the digestive tract. Eating utensils may be the media of transmission; milk and meat are frequently infected. Among the things which Kober indicts are: allowing babies to creep on a dirty floor, long skirts and unsanitary dwellings. Flies are also a frequent source of infection. Damp soil and houses predispose to Tb. City dwellers should remember that the greater the park space in their communities the less will be the Tb. The death rate has dropped from 326 per 100,000 in 1880 to 147.6 in 1913.—*Editorial, Medical Record, Sept. 2, 1916.*

Rest and Exercise in Tb.—A thorough knowledge of the principles of rest and of exercise must underlie the treatment of tbc. Neither exercise nor rest is to be prescribed offhand, but so long as there are symptoms pointing to an overworked body, rest is indicated, the character and amount to be carefully prescribed; with improvement, exercise slowly increased provides the safest means of regaining health and strength Exercise must be increased gradually, as a single act of over-exertion may delay recovery months or years, or even preclude it. The transitional period should be under careful medical supervision until the patient is able to withstand without harm more than he will be called upon to endure when he takes up active work.—*Rest and Exercise in Tuberculosis, Th. Fraser* (Asheville) *South. Med. Jour., July, 1916.*

Cyanocuprol in Tb.—In eigtheen cases of Tb. treated with cyanocuprol the results were markedly effective. It may be used more generally than tuberculin. The maximum dose of 8.5 c.c. should never be exceeded. The shortest interval between injections should be two weeks. The patient should be placed under conditions of complete physical and mental rest after the injection. Rest to the lesion is also necessary. Irritants to the lesion, such as potassium iodide or tuberculin, should be avoided. No marked idiosyncrasy has been noted and no cumulative effects have been observed.—*The Treatment of Tuberculosis with Cyanocuprol, Morisuke Otani, Journal of Experimental Medicine, Aug. 1, 1916.*

Cases of Surgical Tb.—Illustrative cases of extensive perirectal suppuration, extensive cervical adenitis with sinuses, old and recent abdominal Tb., are cited from the surgical service of Sea View Hospital (New York City), proving that thorough dissection of even old and widespread tbc. foci can accomplish local cure and improve the accompanying pulmonary disease.—*Clinical Notes from the First Surgical Division of Sea View Hospital, A. Nicoll & M. J. Horan, N. Y. Med. Jour., June 24, 1916.*

TRUST FAMILY DOCTOR, NOT SCIENTIST, HE SAYS.

Dr. Beverly Robinson Declares New York Will Be Better Off Then in Epidemics.

New York will be better off in the next epidemic if the authorities rely more on family doctors of experience, and less on scientists, experts and specialists, according to Dr. Beverly Robinson, clinical lecturer at Bellevue and consulting physician at St. Luke's and the City Hospitals.

"To the pure scientist, the laboratory worker," he says in yesterday's New York *Medical Journal*, "it seems as though his word was law, to be listened to and obeyed first of all; yet we know *his knowledge is almost wholly experimental* and only some of it will endure, and maybe the larger portion will later be shown to be faulty and misleading."

Dr. Robinson speaks of *severe and impractical rules laid down by health authorities acting on scientific advice.* Then he praises the general practitioner and says: "Therefore, *in every health board, in every hospital, among the specialists of different sorts, the presiding and controlling man should be the all around physician.*

"Had this been the case we should not have seen, as we have, the exaggerated terror prevalent in the late epidemic; we should not have had *regulations of quarantine and care insisted upon which were illusory;* we should not have had daily heralded in every newspaper the experimental doings from the latest researches of the laboratories, which may not prove ultimately of great practical value."

Of the blood serum treatment he says: "We must not run wild about new findings."

—*The Medical Economist.*

BIRTH CONTROL AND BRAIN STORMS.

"Birth Control" seems to be irritating the minds of a few medics and an occasional professor. Won't some one invent a "Brain Storm" control?

THE DOCTOR.

Ah, who would choose to be a Doctor—
A Microbe-stalking Pill-concocter!
At 3 a. m. they ring his Bell
Because some Fellow's dined too well.
He has to leave a Joyous Frolic
Because a Baby gets a Colic;
And while subduing Mortal Ills
With Jalap, Ipecac and Squills,
He has to hear the Conversations
Of Patients, matching Operations;
And then, to crown his Pain and Strife,
They villify him here, in "Life."

—*Arthur Guiterman in "Life."*

PAINFUL AFFECTIONS OF THE FEET

(Continued from page 118.)

a clinical entity which should be mistaken for nothing but syphilis.

After having suggested some of the many causes of painful feet, I can only say in conclusion, let us give these cases the benefit of at least as careful investigation as we would if they suffered from equally painful ailments elsewhere in the body.

7 West Madison street.

DO YOU KNOW THAT

Efficiency decreases as fatigue increases?

The full pay-envelope is the great enemy of tuberculosis?

Society Proceedings

COOK COUNTY

CHICAGO MEDICAL SOCIETY.

Scientific Meeting, January 3, 1917.

The President, Dr. A. Augustus O'Neill, in the Chair.

Dr. Frank Smithies discussed the etiologic relationship existing between gastric ulcer and gastric cancer. From a most complete and painstaking study MacCarty has demonstrated that of 280 resected chronic, calloused gastric ulcers, in which there was no clinical or gross surgical hint of malignancy, 63 per cent. showed evidences of a typical or undifferentiated cells in their hyperplastic edges. Dr. Smithies' study of 544 surgically demonstrated cases of gastric ulcer in no way indicates the frequency of cancer formation from such. Presuming that the 540 cases of gastric ulcer form part of a group of ulcer cases which arose at some time previously, it is manifestly impossible to tell what course the original group has taken, namely, how many have healed spontaneously or with the aid of medical care, how many had survived as benign ulcer cases, or on how many have surgical procedures been performed, and how many have terminated as cancers. In the author's opinion the above facts furnished insurmountable obstacles to the possibility of any, even approximately correct, estimate being made with regard to the frequency with which benign gastric ulcer becomes cancer.

As to the position in the stomach wall of gastric ulcers and gastric cancers, in 37 per cent. of his cases of cancer the neoplasm was located at the pylorus. In 28.2 per cent. on the lesser curvature or antrum; in 18.3 per cent. it was general; in 6.8 per cent. on the posterior wall; in 5 per cent. at the cardia; in 1.3 per cent. on the greater curvature; in 0.65 per cent. at the fundus, and 0.5 on the anterior wall. In approximately 3 per cent. of instances the location of the growth was not exactly determined.

Dr. W. W. Hamburger spoke on the mechanism of

gastric pain in chronic ulcer, its importance in diagnosis and treatment. Although the theory of acid irritation is attractive and seemingly logical, certain clinical experiences can be cited which tend to throw some doubt on its validity. 1. Pain is usually absent in acute ulcer, even though the stomach be riddled with them. 2. Intervals of complete freedom from pain occur in chronic ulcer, although the base of the ulcer remains in the same position, or although extension is going on in it. 3. Pain may be present without ulcer, as proven by operation or autopsy. 4. Severe pain may occur without ulcer and without free acid. These cases are perhaps the strongest argument against the theory of acid irritation. 5. Pain, indistinguishable from ulcer pain, occurs in disease of the stomach other than ulcer, or in disease elsewhere, such as the gall-bladder, appendix, lungs, heart, kidney, and central nervous system. 6. Chronic ulcer may develop and progress entirely without pain as evidenced by (a) the large group of latent ulcers; (b) the finding of old scars at autopsy in individuals, who, during life, never suffered with gastric distress; (c) the cases progressing latently, suddenly announcing themselves by an acute hemorrhage or perforation; (d) finally the chronic deep ulcers found in aged individuals progressing entirely without symptoms during life. 7. The absence of pain in operatively proven cases of ulcer, in whom varying amounts and degrees of hydrochloric acid had been swallowed or injected.

The contradictions brought out by these experiences and others have thrown considerable doubt on the simple explanation of the acid stimulation of the ulcer base. The following are among the most prominent theories advanced concerning the pathogenesis of ulcer pain: 1. Congestion of splanchnic vessels and gastric mucosa during periods of digestion and emotional excitement. 2. Neuritis or neuralgia of stomach nerves. 3. Local lymphangitis following infection of ulcer, with or without subsequent involvement of serosa. 4. Inflammatory exacerbation. 5. Pyloric spasm. 6. Perigastritis and local peritonitis. 7. Dragging on the peritoneum and adhesions. 8. Mechanical irritation by food. 9. Increase in gastric muscle tension from a rise in intragastric tension.

Dr. Alfred Strauss spoke on the modern surgical treatment of gastric ulcer and its relation to plastic surgery of the stomach. As to the question of operative procedures in perforation of the ulcers, the author spoke of those cases of perforated ulcer in which there is marked induration of the area surrounding the ulcer. The usual procedure is to place a pursestring suture around such an ulcer and invert it and occasionally reinforce it with Lembert sutures. When the location of the ulcer is in the pyloric antrum or pylorus, this produces a marked obstruction, and for this reason he reported a method by which he has simply cauterized or curetted the ulcer, brought the edges together with a few interrupted silk sutures, placed a fascial transplant from the anterior sheath of the rectus over the ulcer and indurated area and attached it to the normal tissue with interrupted waxed silk sutures. In addition, the free end of the great omentum was sutured over the transplant. This prevents leakage and vascularizes and vitalizes the fascial transplant, and nourishes and helps to vascularize the anemic, necrotic area in which the ulcer has occurred, thereby promoting the healing of the ulcer. He believes that the simple pursestring inversion of perforated ulcer must break through the necrotic and indurated portion of the stomach and account for many of the secondary leakages which occur on the third or fourth day following this operation. He has operated three such cases of perforated ulcer by this fascial transplant method and all have made uneventful recoveries.

Scientific Meeting, January 10, 1917.

Hon. Francis Neilson, Member of the British Parliament, spoke on social insurance, its bearing on the medical profession and the public, as observed in Great Britain and the continent. He gave a general idea of how the insurance bill was introduced in Parliament, and stated that he wanted the medical profession in America in their agitation regarding such legislation as health insurance to be wise and not make the mistakes they did in Great Britain. Physicians should familiarize themselves with every phase of the subject before securing legislation. After the insurance act went into operation they found there was resentment and dissatisfaction all over the country. A number of amendments had to be passed, but he thought it perfectly fair to say that the English Act has not had a fair trial in the two years and a few months it was in operation before the outbreak of the war. An act of that kind should be tested for at least ten years before final judgment is pronounced upon it. If people are given the idea that the state is going to help them, their attention is taken away from the fundamental principles of justice. They cease to study fundamental problems. They do not go to the root of things at all. This measure is only palliative; it is not curative.

Scientific Meeting, January 17, 1917.

Dr. Joseph L. Miller spoke on what medicine has accomplished in Cook County Hospital and how it can be improved. At present the Cook County Hospital is well equipped, has an enthusiastic staff, an excellent intern body, and is doing a class of work on a par with the best hospitals in the city. At no time in the history of the hospital have the patients so uniformly received good medical service as at present. Until the introduction of civil service at the hospital there was such a lack of organization with consequent insufficient co-operation of the various elements that there was little incentive to undertake productive work. Until four years ago the equipment of the hospital, both in apparatus and adequate assistants in the department of Pathology, rendered it practically impossible to carry on but the simplest observations. Now conditions are most favorable, not only for doing the highest grade of medical teaching, but also for carrying on investigative work.

Dr. Maximilian Herzog said that nothing has been so fruitful in final beneficial results in medicine as pure

scientific research work, primarily undertaken to discover a truth of nature without any view to direct and immediate useful results. It is the duty of the profession to try to institute in large public hospitals laboratories where not only the routine work, but also scientific research can be properly conducted. Research work in the laboratory of pathology of Cook County Hospital has recently received a powerful stimulus in connection with the work on poliomyelitis conducted there. This work has been made possible by the order of the Health Commissioner, Dr. Robertson, to hospitalize all cases of poliomyelitis. If these cases had not been collected into the County Hospital and had been distributed sporadically over the city, very little could have been accomplished, but their central location permitted a control and a scientific investigation of the material.

Dr. J. Rawson Pennington urged that the society ask the Board of Cook County Commissioners to request the public to lend a helping hand in building the necessary laboratories for Cook County Hospital. He introduced a resolution to that effect, asking that a committee of 40 members be appointed with the President of the Chicago Medical Society as its Chairman for the purpose of conferring with the President and the members of the Board of Cook County Commissioners concerning ways and means for constructing and equipping a comprehensive pathological and research laboratory or laboratories for Cook County Hospital, and for the purpose of finding ways and means to arouse enthusiastic interest among members of the profession and the public concerning the great importance and the necessity for these laboratories.

Dr. E. Wyllys Andrews, in speaking of the surgical achievements and possibilities in Cook County Hospital, stated that a little over three years ago he was selected by the civil service as chief of the surgical division of the County Hospital, and he said it is a privilege to have been associated with such a progressive group of sixteen attending surgeons, selected after a strenuous competitive examination of well-known specialists, writers and instructors, representing the best institutions in the city. The initiative for this great chance came from two county board presidents—men with unusual foresight and public spirit—Mr. McCormick and Mr. Reinberg, and from the able committee of physicians of this city who spent several months in planning the new organization. He called attention to the excellent work that has been and is being done by Warden Smith to build up the institution and to make it one of the most modern hospitals.

Dr. Karl Meyers said that the functions of a charity institution are, first, to take care of the sick of the county. The County Hospital is adequately doing this at the present time. The second thing for a charity hospital to do is to teach young medical men to become physicians and surgeons of recognized repute. Third, to undertake undergraduate teaching. The undergraduate teaching at the Cook County Hospital is as good as it is in any hospital in the country.

J. V. Fowler, Secretary.

CHICAGO OPHTHALMOLOGICAL SOCIETY

Meeting of May 22, 1916—Continued.

DISCUSSION.

Dr. Harry S. Gradle said he had reported 360 cases in the archives of ophthalmology of enucleation and evisceration, with and without fat implantation, and that he was very glad to see these cases of Dr. Suker's because they bear out the reports which he had made at that time. In that report the speaker had said that fat implantation can be used in every case of enucleation of the eyeball and, in cases of evisceration, fat implantation can be used in every case, except in the presence of infection of coats of the eye. In some eight cases of protrusion of fat, out of 120 odd implantations, practically all were due to the implantation of fat in the face of an acute infection. Apart from these acute infections, there are no contraindications to the implantation of fat into either the sclera or the capsule of Tenon. The cosmetic effect is wonderfully improved in either condition. There is one decided advantage if fat is to be implanted following evisceration. If there should be protrusion of fat or if not enough fat were put in, at any time within three or four weeks after the operation, this defect can be remedied by the injection of paraffin. There is some absorption of fat after implantation of fat into the capsule of Tenon, but it is small. This fat forms itself into funnel-shape, with the apex lying at the apex of the orbit. The implantation of fat into the sclera capsule is not followed by any absorption of fat to speak of. Two precautions, however, must be taken: Too much fat cannot be implanted into the scleral capsule on account of pressure and the extrusion of the fat. On the other hand, in the implantation of fat in Tenon's capsule a larger amount must be implanted. If the suturing is done carefully the effect of pressure is negligible.

Dr. Suker, closing the discussion, said that one cannot reason from dog to man, because the Tenon's capsule of a dog is not nearly as resistant as that in man. The absorption that takes place in man is relatively little and enucleation properly done does not disturb the posterior portion of the capsule of Tenon. The longest implantation of fat he has had in the capsule of Tenon is a little over two years and the amount of fat there has remained practically the same as when first transplanted.

REPORT OF CASES

Dr. William A. Fisher, in presenting a case, said that many competent operators believe that the old operation is safer than the intracapsular operation as practiced by Colonel Smith in India; the intracapsular operation being condemned on account of the loss of vitreous. With the slight modifications made by the speaker in the Smith technic, the danger of the loss of vitreous is less in the intracapsular operation than in the old method.

The speaker exhibited a male patient, aged 63, with immature cataract in both eyes; vision, right, 4/200; left, 10/200. The intracapsular operation was performed on the right eye April 8. Both eyes bandaged nine days. No pain or inconvenience; not confined to bed. Bandage removed at end of nine days. Patient could count fingers at five feet. Smoked glasses prescribed with no other treatment. Thirteen days after operation there was scarcely any redness; left eye was operated upon in same manner as right. Bandages omitted after nine days and smoked glasses ordered. No pain or inconvenience from second operation. Patient dismissed from hospital May 16. On leaving hospital his vision in the right eye was 20/15 with plus 10, and 20/20 in the left with plus

10. The speaker said he used the same amount and kind of pressure with the modified technic as is made in India; that the needle is only used when the lens refuses to be born after safe pressure. The needle is no part of the Smith technic. The incision is always made in the cornea; there has been no loss of vitreous in the last 20 operations; there have been 3 cases of post-operative inflammation in the last 94 operations; the better the intracapsular technic is understood the less often will the needle be necessary.

The speaker has obtained 20/20 in more than half of 94 consecutive cases recently reported.

There are many who would oppose these procedures described, but the speaker is of the opinion after operating 200 eyes in this manner that there is more to be said in favor than against operating upon both eyes at the same time.

DISCUSSION.

Dr. George F. Suker said that there is no question about the intracapsular operation being the ideal one. There is only one objection, an anterior vitreous haze occasionally occurs, which is principally in the hyaloid membrane. When this membrane is injured or wrinkled it remains so and accounts for the apparent capsular remains in some of these intracapsular extractions. This does not occur very frequently, however. If the corrugation and wrinkling of the hyaloid membrane is very intense, it is advisable to needle very cautiously. What causes this wrinkling he does not know.

Dr. Fisher, in closing the discussion, said that he had not had the experience of this wrinkling, and that it might be due to faulty technic; that he could always see the fundus without trouble upon getting the lens out.

PAUL GUILFORD, Secretary.

CHICAGO ROENTGEN SOCIETY.

Regular meeting held at the Cook County Hospital, Dec. 9, 1916.

The initial number on the program was the presentation of plates with case reports.

Dr. Moir exhibited plates of a case of eventration of the diaphragm; this diagnosis was essentially attained by the administration of an opaque meal. The original clinical diagnosis was dextra cardiac.

Dr. Hollis E. Potter showed some unusual plates: Case 1. Presented shadows simulating ureteral calculi; however, a unique method of projection showed almost conclusively that these shadows were extra ureteral. Early history was highly suggestive of tuberculous peritonitis; therefore, it was assumed that these shadows were calcified glands.

Case 2. Diagnosis difficult. Patient suffered with terrific pains in back of neck, positional behind right side of mediastinum. Pain does not radiate. No pulsation. Had had abscess attached to abdominal wall. It was drained and healed. Had hernia. Dr. Potter thought it might be an infected, broken down gland.

Case 3. Highly interesting because unusual. A lateral roentgenogram of the head showing a spongy network, probably osseous tumor, involving the region of the optic chiasm.

Dr. M. J. Hubeny showed three cases: Case 1. A roentgenogram showing a shadow of a mole on the back; also a renal calculus. Singular, because of this occurrence in one patient.

Case 2. Marked syphilitic osteo-porosis. Wassermann—positive.

Case 3. Apparently detached bone involving internal condyle of femur. Age 19; sex, male; history, negative for trauma. Repeated roentgen examination for the past year and a half showed a quiescent condition. Alban Kohler quotes, trauma, infarct or osteo-chondritis dissicans as causative factors.

The next regular number on the program was a paper by Dr. Fred Zapffe, which is subjoined:

THE ROENTGEN RAY IN THE DIAGNOSIS OF BONE TUMORS.

FRED. C. ZAPFFE, M. D., F. A. C. S.

CHICAGO.

Abstract. Bone tumors are common. Owing to the nature of the structures entering into the formation of bone, every variety of tumor is found in bones and in periosteum. Carcinoma, hypernephroma and thyroid cancers are always secondary in bone. All the other types of tumor are primary. The diagnosis of these tumors is not yet sufficiently well developed to make their detection always possible. Of greatest importance in the diagnosis is the clinical history, a fact which was emphasized repeatedly in all of his talks and writings by the late Dr. John B. Murphy. Trauma seems to play a great rôle in the etiology of these tumors, but perhaps we are a little too prone to read trauma into the history. However, there is no doubt that the younger the patient the greater the influence of trauma, so far as a clinical history is concerned. The location of the tumor with reference to the epiphysis must be considered also. The greatest attention should be paid to indefinite referred pains, or to any pain, in fact, for which the cause is not readily elicited. It is here that the roentgen ray is of the greatest value, but roentgenograms should be made not only early, but sufficiently often; that is, at intervals, so that when the pathology in the bone does make its appearance, the roentgen ray can detect it. If only one roentgenogram is made early in the history of the case, there may not be sufficient pathology present to be detected by the ray. A second roentgenogram, made a month later, may show the condition.

A second point to bear in mind is the fact that pain may be reflected, say to the hip, when the tumor is situated at some distance from the hip. Hence a roentgenogram of the hip would be negative, while a roentgenogram of the entire upper leg would disclose the tumor. Therefore, a sufficiently large area should be covered in the roentgen examination.

The laboratory diagnosis is third in importance in the diagnosis of bone tumors. But with improved methods of examination and with greater knowledge of the histology and pathogenesis of bone tumors this means of diagnosis bids fair to be of greater value than it now is.

Needless to say the interpretation of the roentgenogram is a matter of prime importance, because bone

cysts should not be labeled sarcomata and a sarcoma should not be called a bone cyst. The same applies to several other forms of tumors, as one type might easily be taken for another if the examination is not thorough and painstaking.

The literature contains many instances in which a malignant tumor of the bone was mistaken for a benign tumor by the roentgenologist, and the clinical history, probably because of such findings, was misinterpreted. In two instances reported by a well-known surgeon, a myositis ossificans was mistaken for sarcoma. The patient was advised to have an amputation of the leg, but fortunately in this case deferred action and consulted the surgeon referred to who made the correct diagnosis, which was confirmed by operation, thus saving the patient's limb. To make an early diagnosis of a malignant tumor, and this refers merely to sarcoma, the patient will also often be spared the loss of a limb. Sarcoma usually is of the type which permits of removal without amputation, and if this is done early recurrence rarely takes place. Metastases unfortunately do occur afterward in these cases, and inasmuch as the lung is usually the site of the metastases, a fatal termination is inevitable.

Summarizing the whole subject briefly, one may say that a good clinical history, early, repeated and sufficiently extensive roentgen examination, with prompt and proper treatment, offer a large measure of success in the treatment of bone tumors.

Dr. James T. Case,
President.
Dr. M. J. Hubeny,
Secretary.

GREENE COUNTY.

The annual meeting of the Greene County Medical Society was held in the City Council Chamber at White Hall, December 15, 1916.

The meeting was called to order at 12:00 noon, by H. W. Chapman, president pro tem., President Thomas and Vice-President Hawthorne, both being absent.

In view of the fact that this society lost two of its members since the last meeting, a committee, consisting of H. W. Smith, Roodhouse; Howard Burns, Carrollton, and F. N. McLaren, White Hall, was appointed, and the following resolutions were presented and adopted:

Whereas, The Almighty has decreed that two of our beloved friends and colleagues, in the persons of G. W. Ross, of Carrollton, and C. B. Foreman, of Kane, join the forces of the great Beyond, Be it

Resolved, That the Greene County Medical Society desires hereby to record a sense of loss felt by all its members and to express its admiration of the many excellent professional and social qualities possessed by both the deceased; and be it further

Resolved, That these resolutions be spread upon the minutes of this Society, and that a copy be sent to the families of each of the deceased.

H. W. Smith,
Howard Burns,
F. N. McLaren.

Drs. W. T. Knox and J. S. Billings were elected to membership.

The following officers were elected: O. L. Edwards, Roodhouse, president; E. E. Jouett, Carrollton, vice-president; L. O. Frech, White Hall, secretary-treasurer; E. J. Peek, White Hall, censor (three years). F. N. McLaren, White Hall, was elected Censor for one year, to fill the unexpired term of C. B. Foreman, Kane, deceased. H. A. Chapin resigned as delegate to the State Meeting, and L. O. Frech was elected to fill the unexpired term of one year. Howard Burns was elected alternate to fill the unexpired term of L. O. Frech.

The new president appointed the following as the Legislative Committee: Chairmen, Howard Burns, R. O. Hawthorne, F. N. McLaren.

The Society regrets very much the loss of its former secretary and treasurer, H. A. Chapin, who has served the Society well in that capacity since 1902. He has been a faithful and untiring worker and much of the success of the Society has been due to his efforts.

Upon motion the Society adjourned, to meet again at 1:45 p. m.

Dinner was served the members of the Society by the ladies of the First M. E. Church, and the repast was heartily enjoyed by all present.

Society convened at 2:00 p. m. and was called to order by President C. R. Thomas. A very interesting paper on "Some Diagnostic Points in Surgery" was read by Dr. J. W. Hairgrove, of Jacksonville, and many of the latest instruments of diagnostic precision were shown by him at this time.

H. A. Chapin, presented a paper on "The Scope and Utility of the Roentgen Ray," and a number of slides were shown which clinched the arguments of the Doctor's paper.

Fourteen members and one visitor were present.

Censors reported Carrollton as the next place of meeting, to be held Friday, February 9, 1917, after which the Society adjourned.

Dr. L. O. Frech,
Secretary.

JO DAVIESS COUNTY

The Jo Daviess County Medical Society met in the parlors of the Warren Hotel. Meeting called to order by the President, A. T. Nadig, at 1:30 p. m., January 4, and three visitors were present.

Drs. Brink of Apple River and Best of Freeport, were elected to membership.

The President appointed as auditing committee: Renwick, Bench and Runkle; as committee to revise the fee bill: Bench and Runkle, of Joe Daviess, and D. G. Smith, of Stevenson counties; as committee to nominate new officers for the ensuing year: Kreider, D. G. Smith and I. C. Smith.

The following officers were elected: President, Kellar; vice-president, Fleege; secretary-treasurer, Stafford; censor for three years, Hagie; censor for two years, Boots; censor for one year, I. C. Smith;

representative to State meeting, Bench; alternate, Gollobith.

Committee reported the following apportionment of entertainment divisions:

Galena—Bench, W. A. Smith, Dolomore, Fleege, Miller, W. F. Smith.

Warren—Brink, Rodge, Kellar, Czibulka, Downing, Renwick.

Stockton—Kreider, I. C. Smith, Stafford, Runkle, Tyrrell, Rice.

Elizabeth—Nadig, Boots, Gollobith, Logan, Hagie, Lewis.

Dr. E. Windmueller, of Woodstock, began the scientific program with an excellent paper on "Open Treatment of Extensive Burns and Skin Grafting"; discussed by Snyder, Staley and Guthrie.

Dr. Clark gave "A Few Retrospective and Prospective Thoughts Concerning Some Health Problems," which was most interesting and was discussed by Windmueller, Rice and Staley.

Dr. Staley's paper on "Cancer Problem" held the attention and was discussed by Windmueller, Downing, Guthrie, Snyder and Hagie.

After these most intellectual and instructive subjects had been discussed Dr. Kreider made a motion to extend a vote of thanks to Dr. Windmueller for his efforts in behalf of the society, which was carried unanimously.

The committee on fee bill then reported; motion made, seconded and carried to accept the same as revised by committee.

The business of the meeting concluded, was adjourned, then followed the pleasure of the day in the form of a delicious banquet.

(Signed) U. S. Kellar,
President.
T. J. Stafford,
Secretary.

KANKAKEE COUNTY

The January meeting of the Kankakee County Medical Society was held in the Kankakee County Court House on January 11, with the newly-elected president, Dr. C. W. Geiger, in the chair. An enthusiastic meeting was held in which Dr. A. M. Corwin, of Chicago, read a very interesting and instructive paper on "Professional Returns." As this is a subject close to the heart of all physicians, lively discussion followed, led by Dr. H. D. Singer of the State Psychopathic Institute and Dr. C. F. Smith of Kankakee.

Three new members were elected to the society; two by transfer, Dr. Phipps, of Manteno, and Dr. Eldredge, of Bonfield; and one by application, Dr. Roth, of Kankakee.

The proposed health legislation now before the state legislature was discussed.

A vote of thanks was tendered Dr. Corwin for his address, after which he read some original poetry. (Don't miss an opportunity to hear it.)

Eighteen members and visitors were in attendance.

Edwin S. Hamilton,
Secretary.

MADISON COUNTY

The Madison County Medical Society met in annual session at the rooms of the Retail Merchants' Association in Alton on December 1, with Dr. R. D. Luster, president, in the chair. Members present, 23; visitors, 2.

The annual reports of the secretary and treasurer were read, referred to auditors, found correct, and ordered filed. These reports have been made a matter of record and also published in the *Madison County Doctor*.

An effort was made to promote the present secretary to the office of president and his name was presented in a neat nominating speech by Dr. J. H. Siegel, of Collinsville, but at the earnest solicitation of the secretary, who expressed his gratitude, Dr. Siegel was induced to withdraw the nomination. However, this episode was, on motion of Dr. W. H. C. Smith, made a matter of record. The result of the election is as follows: President, Dr. J. B. Hastings, Alton; vice-president, Dr. J. H. Siegel, Collinsville; secretary, Dr. E. W. Fiegenbaum, Edwardsville; treasurer, Dr. R. S. Barnsback, Edwardsville; state delegate, Dr. Mather Pfeiffenberger, Alton; alternate, Dr. W. H. C. Smith, Godfrey; medico-legal member, Dr. Lay G. Burroughs, Collinsville; censors, Dr. G. Taphorn, Alton; Dr. J. A. Hirsch, Edwardsville; Dr. L. Schreifels, Granite City.

The secretary read a letter from Dr. E. A. Cook, of Alton, expressing his thanks and appreciation, for flowers sent him while confined in St. Anthony's hospital after a surgical operation.

After further alterations and discussion the Fee Bill was adopted and the fee bill committee was requested to have the same printed and distributed. Drs. Sutter and Johnson were appointed to conduct the newly elected president to the chair, where the retiring president presented him with a gavel as his badge of office. Dr. J. B. Hastings, our new president, accepted the gavel and the office in an appropriate speech, pledging himself to work for the interest of the society to the best of his ability.

The secretary was instructed to enter into tentative arrangements to secure the services of Mrs. M. A. Herrick as community nurse for the county from September 1, 1917, for as many months as may be determined by this society at some future meeting.

Dr. W. H. C. Smith, of Godfrey, made a statement in regard to the large increase in the number of morons in this state and of a movement now on foot to take care of this class of defectives and if possible to limit this increase for the future. Whereupon Dr. W. W. Halliburton moved that the society heartily endorses the movement for the better care of the mental defectives known as morons, and will lend its influence and support to any effort that is being made for the protection of these unfortunates and for the protection of society at large. He further moved that we hereby appoint Dr. W. H. C. Smith, of Godfrey, to present our views to the Conference of the State Charities Commission to be held at Hotel La Salle, in Chicago, on December 4, 1916. All of which was unanimously adopted.

PIKE COUNTY

The Pike County Medical Society met in Pittsfield on January 25, 1917, for its mid-winter session. There was a large attendance for the time of year, as the season has been rather sickly and many were unable to be present, especially from a distance.

After reading of the minutes of the last meeting at Barry, an informal discussion took place concerning the high cost of living and the inadequate fees of physicians. On motion of Dr. F. N. Wells, seconded by Dr. Peacock, the society voted to make the minimum price of a normal case of obstetrics $15.00, and $25.00 for an instrumental case; this applying to all of Pike County. No other charge of fees was made at this session, but a raise of fees is being considered by many members in the future.

A circular letter from Dr. Drake, relative to a clinical conference on poliomyelitis was read, and the society is ready and willing to co-operate and attend, the debate for this section being set for February 19.

Dr. R. O. Smith of Pittsfield then read an excellent paper on "Burns and Their Treatment." This received active discussion from nearly every member present.

Dr. O. C. Wise, of Griggsville, followed with a paper on "Pyloric Stenosis and Spasm." This subject was thoroughly treated both from a theoretical as well as a practical standpoint. Case histories of hospital patients in Chicago were alluded to, as well as a recent case seen in private practice.

This session was the largest January meeting in the past four or five years. All the members will boost for the largest meeting the society has ever held at Pittsfield, April 26.

W. E. Shastid, Secretary.

ST. CLAIR COUNTY

The annual meeting of the St. Clair County Medical Society was held at the Elks Club, East St. Louis, January 4, 1917. The president, Dr. B. H. Portuondo, being absent, vice-president Dr. J. H. Fulgham presided.

The following officers were elected for the year 1917: President, Dr. J. H. Fulgham, East St. Louis; vice-president, Dr. Walter C. Wilhelm, East St. Louis; secretary-treasurer, Dr. A. E. Hansing, Belleville (re-elected); board of censors, Drs. C. W. Lillie, Hugo Wangelin and O. J. Culberson; delegate to state convention, Dr. B. H. Portuondo; alternate, Dr. C. W. Lillie; local legal advisor, Dr. C. A. W. Zimmermann.

On motion the society adjourned to meet again at the Elks Club, East St. Louis, on the first Thursday in February at 8:00 o'clock p. m.

A. E. Hansing, Secretary.

Personals

Dr. B. E. Ray, of Cuba, has removed to Lake Geneva, Wis.

Dr. Arthur C. Beyerlein, Colon, Panama, is visiting his parents in Chicago.

Dr. L. A. Burnside announces his removal from West Union to Terre Haute, Ind.

Dr. Arthur Schuettler was operated on for appendicitis in the Ravenswood Hospital, January 18.

Dr. William L. Hanson, Belleville, is on his way to England, where he will enter the Military Hospital Service.

Dr. Abraham L. Desser was seriously injured in a collision between his automobile and a street car, December 31.

Dr. Roscoe C. Giles heads the list of eligibles for appointments on the staff of the Municipal Tuberculosis Sanatorium.

Dr. A. W. Tarr, of Grand Chain, Ill., was operated on for appendicitis January 5, 1917, at St. Marys Hospital, in Cairo.

Dr. Allen B. Kanavel delivered three addresses on cancer in Lincoln, Neb., January 6, speaking before the Women's Club, the physicians of the city and the public.

Dr. Charles B. Johnson, Champaign, has been appointed a director of the Champaign County Tuberculosis Sanatorium, which was authorized at the November election.

Dr. John Webster Melody resumed his series of lectures on "Moral Law in the Medical Profession," January 7, at St. Jarlath's Hall, Hermitage avenue and Jackson boulevard.

Dr. George G. Davis, lieutenant-colonel of the Royal Army Reserve Medical Corps, spoke before the Chicago Alumni Club, January 20, on his experiences in a British base hospital in France.

Dr. Margaret D. Mitchell Macdougall, Aurora, was found seriously injured from a fall from the rear porch of her home December 31. Her husband is under arrest for assault with intent to kill.

Dr. Kellogg Speed, head of the Chicago unit stationed at Boulogne, France, writes that he was on duty thirty-three hours continuously operating on the wounded at the Somme front in July.

Dr. Charles F. Swan, for many years a practitioner of South Chicago, and who has been visiting in Vancouver, Wash., since last September, was stricken with cerebral hemorrhage December 24.

At the annual meeting of the Chicago Society of Internal Medicine the following officers were

elected: President, Dr. Robert B. Preble; vice-president, Dr. Rollin T. Woodyatt; secretary-treasurer, Dr. Charles A. Elliott (re-elected).

Dr. George B. Young, formerly commissioner of health in Chicago, has made a study of public health administration in St. Paul, the report being published as a serial in the current numbers of Public Health *Reports* by the U. S. Public Health Service.

Sister Mary Raphael McGill, for thirty-five years on duty at Mercy Hospital, Chicago, well known to medical students and practitioners, died December 24. Her duties as superintendent have been assumed by Sister Mary Rita, a sister of Dr. David O'Shea. She is a member of the Order of Mercy.

Dr. William D. Napheys, assistant clinician in neurology, Chicago Post-Graduate Hospital and Dispensary, has accepted an appointment on the staff of the Government Hospital for the Insane at Washington, D. C., for further study in neurology and psychiatry, leaving his practice in care of Dr. J. O. Salyers until his return.

Dr. William Healy, who has been head of the Chicago Juvenile Psychopathic Institute for the last seven years, has resigned to accept the position of director of the Harvey H. Baker Foundation, Boston. This foundation was established in memory of the late Judge Baker of the Juvenile Court, to aid that court by making psychopathic examinations of infant children. Dr. Healy was given a complimentary dinner, January 30, by the Chicago Ethical Society at the City Club.

News Notes

—The city council of Quincy has invited the U. S. Public Health Service to conduct a sanitary survey of Quincy in cooperation with the state board of health.

—The Western Roentgen Society will hold its annual meeting at the Hotel Sherman, Chicago, February 16 and 17, 1917. All members of the profession are cordially invited to attend.

—Mrs. Sarah Wheeler has donated her home and property in Lake Bluff, valued at $50,000, to the Wesley Memorial Hospital. The property will be known as the Wheeler Convalescent Home.

—The new Municipal Contagious Disease Hospital in Chicago was opened to patients January 7, under the superintendency of Dr. Edward K. Armstrong. The building is five stories, of which five are devoted to scarlet fever patients.

—At the annual election of the staff of St. Francis' Hospital, Kewanee, January 11, Dr. Peter J. McDermott was elected president; Dr. Gideon H. Hoffman, vice-president, and Dr. H. Nelson Heflin, secretary, all of Kewanee.

—Attorney General Lucey is said to have decided that the special election held in Aurora in December, in which the supervisors of Kane County were authorized to appropriate money for a tuberculosis sanatorium, was illegal, because of incorrect wording of the ballot.

—The sentence of imprisonment for life imposed on Dr. Haldane Clemenson eight years ago for the murder of his wife was cummuted, December 26, to twenty-five years by order of Governor Dunne. With the good conduct allowance, this will allow Dr. Clemenson to be released in 1923.

—At the twenty-fifth annual meeting of the Chicago Ophthalmological Society, held January 15, 1917, the following officers were elected to serve during the ensuing year: President, Dr. Paul Guilford; vice-president, Dr. Francis Lane; secretary and treasurer, Dr. Major H. Worthington; councilor, Dr. G. W. Mahoney.

—At the annual meeting of the Chicago Polish Medical Society the following officers were elected: President, Dr. Wladyslaw A. Kuflewski; vice-president, Dr. Anthony Balcerzak; secretary, Dr. A. Pietrzykowski (re-elected), and treasurer and editor-in-chief of the *Polish Medical Bulletin*, Dr. Nicholas Kalinowski (re-elected).

—Favorable action on an ordinance providing for reporting of venereal diseases without the name of the patient being disclosed was advocated before the city council committee on health, December 26, by Rev. John P. Brushingham, secretary of the morals committee. Addresses in favor of the ordinance were made by Drs. Roy R. Ferguson, Hugo E. Betz, James A. Clark, Eugene H. Wunderlich and Prof. Herbert L. Willett.

—The despised hobo is to be a factor in public health work. Dr. H. C. Yarbrough of the Public Health Service lectured on typhoid fever at the Hobo College, January 27, and other officers are to deliver lectures on other subjects weekly. In return the bos are expected to report sanitary

conditions and contagious diseases in the camps where they are employed from time to time.

—The Coles County Medical Society has taken over the Cumberland County Medical Society and is now Coles-Cumberland Medical Society. The officers for 1917 are as follows: President, William Smith, Toledo; vice-president, O. T. Allen, Ashmore; secretary-treasurer, R. H. Craig, Charleston; delegate to state meeting, R. J. Coultas, Mattoon; alternate, C. E. Morgan, Mattoon; censors, T. O. Freeman, Ed Summers, Mattoon; S. E. Bigler, Neoga.

—The funds for the great medical institution in Chicago have reached an amount within half a million of the amount required, as announced by President Judson last month. Among the donors are J. Ogden Armour, $200,000; Mrs. G. F. Swift, C. H. Swift, Dr. Norman Bridge and a "friend," $100,000 each; the Billings family, $1,000,000. The latter amount is for the Albert Merritt Billings Hospital in memory of the father of C. K. G. Billings and uncle of Dr. Frank Billings.

—At a meeting of the Chicago Neurological Society on January 18 the following resolutions were unanimously adopted:

WHEREAS, Dr. William Healy, the director of the Juvenile Psychopathic Institute of Chicago, has resigned from his position and is leaving for Boston to take up similar duties there, be it

Resolved, That the Chicago Neurological Society wishes to express its regret at Dr. Healy's departure, desires to signify its appreciation of Dr. Healy and his work, and wishes him every success in his new field of labor.

—Drs. J. W. Carlisle, C. E. Price, H. N. Rafferty and A. Lyman Lowe, of Robinson, Ill., have recently formed a partnership and opened a clinic on the co-operative plan. They are now occupying offices on the first floor of the new Robinson Hospital, which was built and equipped by them, and recently opened under the superintendency of Miss Katherina Steinman, St. Vincent's Hospital, Indianapolis, Class 1915. Besides the offices, examination rooms and accommodations for eighteen patients, the hospital has modern operating, obstetric, x-ray and laboratory equipment.

—The following committee has been appointed by Dr. A. A. O'Neill, president of the Chicago Medical Society, to investigate the conflicting claims of Dr. John Nuzum and Dr. Maximilian Herzog as to the discovery of an antitoxin for the cure of infantile paralysis. Professor Walter Haines, Rush Medical College; Professor Ralph Webster, Rush Medical College; Professor Arthur I. Kendall, dean of Northwestern University Medical School; Professor Robert Zeit, chief pathologist, Northwestern University Medical School; Professor D. A. K. Steele, dean of the University of Illinois Medical College; Professor D. J. Davis, professor of pathology at the University of Illinois Medical College; Professor A. J. Ochsner, professor of surgery at the University of Illinois Medical College, and Professor A. E. Eycleshymer, professor of anatomy at the University of Illinois Medical College.

Marriages

WILLIAM JOFFEE, M. D., to Miss Freda Abelson, both of Chicago, January 14.

FREDERICK G. FOX, M. D., to Miss Anna Kuehn, both of Chicago, December 31.

NORMAN DIXON CURRY, M. D., to Miss Neal Jelleneoux, both of Chicago, in October.

GUSTAV KOLISCHER, M. D., Chicago, to Miss Juliette Lippe of New York, December 26.

Obituary

DR. PETER SCHERMERHORN WEIDMAN.

Dr. Peter Schermerhorn Weidman, a man who for 41 years administered to the wants of the people in the eastern section of Madison County, Ill., was born in Schoharie Court House, New York, May 2, 1826. He gained his preliminary and classical education in the common schools and the academy of his native village and at the age of 24 began the study of medicine under preceptors and at Ann Arbor. He took his last year at Albany Medical College, New York, from which he graduated in 1855. After practicing in New York for two years, he came west and located at Marine, Ill., in March, 1857, and immediately began an active business that was to last for many years. His was essentially a country practice, extending for many miles in all directions, and either on horseback or in his high-wheeled sulky he became a familiar figure in all the surrounding territory during the earlier years of his activity. When he first came to Marine, he found five physicians already located there, and lived long enough to see twenty-five doctors come and go in that community during his professional career. He did a

general practice and was a fair example of the type of "old family doctor," so general in that day, and so unusual now.

He retired from active work in 1898, and after living in Marine two years more, moved to Edwardsville and took up his residence in the Leland hotel, where he remained until March, 1915, when he was taken to Jacksonville State Hospital, where he died on January 2, 1917.

Deaths

CHARLES E. CALDWELL, M. D., Chicago; Rush Medical College, 1877; aged 65; died at his home, January 5, from pneumonia.

JOHN BECKER, M. D., Chicago; Rush Medical College, 1865; aged 87; died at his home, December 29, from tuberculosis.

LOTHAR M. SCHWARZ, M. D., Chicago; Jenner Medical College, 1897; aged 54; died at his home, December 21, from cirrhosis of the liver.

EFFA A. OSBORN NORTON, M. D., Chicago; Curtis Physio-Medical Institute, Indianapolis, 1896; died at her home, December 22, from diabetes.

JAMES W. FITZMAURICE, M. D., Chicago; Rush Medical College, 1889; aged 56; formerly a member of the Illinois State Medical Society; died at his home, December 29, from uremia.

WILLIAM DAVID HOLLMERS, M. D., Chicago; College of Physicians and Surgeons, Chicago, 1915; an intern in Cook County Hospital, Chicago; died in that institution, December 23, from typhoid fever.

JOHN T. FUGATE, M. D., Urbana, Ill.; Missouri Medical College, St. Louis, 1859; aged 86; one of the oldest practitioners of central Illinois; died at the home of his daughter in Urbana, December 25, from senile debility.

EMORY OLIVER ONION, M. D., Summum, Ill.; Keokuk (Iowa) Medical College, 1906; aged 38; a Fellow of the American Medical Association; died December 16, in the Macomb (Ill.) Hospital, where he had been under treatment for tuberculosis.

JOSEPH J. PIERRON, M. D., Chicago; College of Physicians and Surgeons, Chicago, 1893; aged 61; chief surgeon to the Chicago Terminal Traction-Railroad Company and local surgeon of the Chicago Great Western Railway; died at his home, December 14, from diabetes.

JAMES A. CLYNE, M. D., Joliet, Ill.; Albany (N. Y.) Medical College, 1886; aged 56; a Fellow of the American Medical Association; formerly president of the Will County Medical Society; local surgeon of the Chicago and Alton Railroad for twenty years, and in 1893 and 1894 health officer of Joliet; died at his home, November 8, from carcinoma of the throat.

W. FRANKLIN COLEMAN, M. D., Chicago; Queens University, Kingston, Ont., 1863; M. R. C. S. (Eng.), 1870; aged 79; formerly a Fellow of the American Medical Association; one of the founders and president of, and professor of ophthalmology in the Post-Graduate Medical School of Chicago; well known as a specialist in diseases of the eye, ear, nose and throat; died in Hastings, Fla., January 22.

SAMUEL ANDERSON MCWILLIAMS, M. D., Chicago; Northwestern University Medical School, 1866; aged 81; a Fellow of the American Medical Association; formerly lecturer on urinary and renal disorders in his alma mater and later professor of anatomy in the Northwestern University Woman's Medical School; one of the organizers of the College of Physicians and Surgeons, Chicago, and later one of the founders of the Chicago Hospital College of Medicine; professor of diseases of the chest, clinical, medical and physiology in Reliance Medical College, Chicago; a specialist in physical diagnosis; died at his home, January 4, from arteriosclerosis.

NEW AND NON-OFFICIAL REMEDIES.

During December the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion with New and Non-official Remedies:

Merck & Co.: Formin Tablets, 5 gr. and 7½ gr.; Veronal Tablets, 5 gr.

H. K. Mulford Company: Pertussis Bacterin, Mulford.

Schering & Glatz: Iocamfen; Iocamfen Ampules.

E. R. Squibb & Sons: Urease-Squibb.

Non-proprietary articles: Acetylsalicylic Acid; Neutral Solution of Chlorinated Soda.

Mercurialized Serum-Mulford. The following dosage forms of mercurialized serum-Mulford, described in New and Non-official Remedies, 1916, p. 192:

Mercurialized Serum-Mulford, No. 5-A. Each package contains one 8 Cc. graduated sterile glass syringe with sterile needle, containing the equivalent of 0.0055 Gm. (1/12 grain) mercuric chloride.

Mercurialized Serum-Mulford, No. 5-B. Each package contains one 8 Cc. graduated sterile glass syringe with sterile needle, containing the equivalent of 0.011 Gm. (1/6 grain) mercuric chloride.

Mercurialized Serum-Mulford, No. 6-A. Each package contains ten 8 Cc. graduated sterile glass syringes with sterile needle, each containing the equivalent of 0.0055 Gm. (1/12 grain) mercuric chloride.

Mercurialized Serum-Mulford, No. 6-B. Each package contains ten 8 Cc. graduated sterile glass syringes with sterile needle, each containing the equivalent of 0.011 Gm. (1/6 grain) mercuric chloride. H. K. Mulford Company, Philadelphia, Pa. (Jour. A. M. A., Dec. 9, 1916, p. 1759.)

Pertussis Bacterin-Mulford. A pertussis bacillus vaccine (see N. N. R., 1916, p. 321). Pertussis Bacterin-Mulford is sold in packages of four syringes containing 50, 100, 200, and 400 million killed Bordet-Gengou bacilli. H. K. Mulford Company, Philadelphia, Pa. (Jour. A. M. A., Dec. 16, 1916, p. 1851.)

During January the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion with New and Non-official Remedies:

Merck & Co.: Barium Sulphate, Merck, for X-ray diagnosis. Therobromide, Merck.

Powers-Weightman-Rosengarten Co.: Barium Sulphate, P. W. R., for X-ray diagnosis.

Western Chemical Company: Tabellæ Dulces Aristochin (Western) 1 gr.; Tabellæ Dulces Heroin (Western) 1/100 gr.; Tabellæ Dulces Novaspirin (Western) ¼ gr.; Tabellæ Dulces Tannalbin (Western) 1 gr.; Tabellæ Dulces Terpin Hydrate with Heroin (Western) 1/100 gr.

Formin Tablets, 5 grains.—Each tablet contains 5 grains of formin (see New and Non-official Remedies, 1916, p. 138.) Merck & Co., New York.

Formin Tablets, 7½ grains.—Each tablet contains 7½ grains of formin (see New and Nonofficial Remedies, 1916, p. 138). Merck and Co., New York.

Veronal Tablets, 5 grains.—Each tablet contains 5 grains of veronal (see New and Nonofficial Remedies, 1916, p. 92). Merck & Co., New York (Jour. A. M. A., Jan. 6, 1917, p. 35).

Urease.—An enzyme found in certain beans, fungi and micro-organisms which, in the presence of water, converts urea into ammonium carbonate. It is used in the determination of urea in the urine, blood and other body fluids, either by determining the increase in alkalinity of the fluid to which it is added, or else the ammonia produced by it in the fluid is removed and estimated.

Urease-Squibb.—A standardized preparation of urease obtained from the jack bean. It is supplied in the form of powder and tablets containing 0.1 gm. E. R. Squibb & Sons, New York.

Neutral Solution of Chlorinated Soda.—Solution Chlorinated Soda, Dakin.—Solution Chlorinated Soda, Carrel-Dakin.—A chlorinated soda solution, containing 0.43 to 0.48 per cent of available chlorine, free from caustic alkali. It is prepared by treating a suspension of chlorinated lime in water with definite amounts of sodium carbonate and sodium bicarbonate and adjusting the separated clear liquid to the required content of available chlorine. The solution is not reddened by phenolphtahlein. It must be protected from light. The solution has been used for the irrigation of wounds, especially infected war wounds.

Theobromine-Merck.—A brand complying with the standards for theobromine—N. N. R. Merck & Co., New York.

Barium Sulphate, P. W. R. for X-Ray Diagnosis.—A brand complying with the standards for barium sulphate for Roentgen-ray work—N. N. R. Powers-Weightman-Rosengarten Co., Philadelphia.

Barium Sulphate, Merck for X-Ray Diagnosis.—A brand complying with the standards for barium sulphate for Roentgen-ray work—N. N. R. Merck & Co., New York. (Jour. A. M. A., Jan. 13, 1917, p. 121.)

Acetylsalicylic Acid.—Acidum acetylsalicylicum. Aspirin. The acetyl derivative of salicylic acid. Dosage: 0.3 to 1.0 gm., repeated once in 3 hours until symptoms of salicylism are noted. It may be dispensed as powders (in wax paper), wafers or capsules.

Iocamfen.—A liquid obtained by the interaction of iodin 10 parts, phenol 20 parts, and camphor 70 parts, containing about 7.25 per cent free iodin. Iocamfen is said to have antiseptic and germicidal properties of iodin and also the analgesic, stimulating and antiphlogistic properties of camphor and phenol. It is used in dressing wounds, etc. Iocamfen is also supplied as Iocamfen Ampules, containing 20 minims iocamfen. Schering & Glatz, New York (Jour. A. M. A., Jan. 20, 1917, p. 199).

Book Notices

THE CLINICS OF JOHN B. MURPHY, M. D., at Mercy Hospital, Chicago. Vol. V, No. 6 (December, 1916). Octavo of 217 pages, 47 illustrations. Philadelphia and London: W. B. Saunders Company, 1916. Published bi-monthly. Price per year, paper, $8.00; cloth, $12.00.

The last volume of the Murphy Clinics is off the press—the last work of the master surgeon.

Besides a portrait of Dr. Murphy, an editor's preface and tributes by several of the dead surgeon's friends, the volume contains among others, discussions on the following subjects: Osteosarcoma; Angioma of Lip; Ancient Injury to Skull With Focal Signs; Toxic Goiter With Melancholia; Posterior Luxation of Elbow; Ununited Fracture of Radius; Carcinoma of Breast; Adoption of an Attached Pedicled Flap for the Cure of an Impassable Stricture of the Urethra; Hydrocele, Osteomyelitis of Femur; Chronic Eburnative Osteoitis of Femur; Sarcoma of Leg; Tuberculous Tenosynovitis of Peroneal Tendons.

The W. B. Saunders Company will follow the Murphy Clinics with The Surgical Clinics of Chicago. These will have the advantage of many clinicians. They will give the word for word teachings of several of the better known Chicago surgeons.

THE NERVO-MUSCULAR MECHANISM OF THE EYES AND ROUTINE IN EYE WORK, by G. C. Savage, M. D., author of New Truths in Ophthalmology (1893); of Ophthalmic Myology (1902-11); of Ophthalmic Neuro-Myology (1905); ex-president of the Nashville Academy of Medcine; ex-president of the Southern Medical Association; ex-chairman of Section of Ophthalmology of American Medical Association. Three full-page plates and four cuts. Published by the author, Nashville, Tenn. Price, $1.00.

This little book consists of two lectures. One, dealing with the nervo-muscular mechanisms of the eyes, is technical—anatomical; the other, "Routine in Eye Work," deals largely with the system used in an office, and methods of conducting preliminary examination. It is an excellent article for the beginning practitioner.

Saving the Country $200,000,000 a Year

The Story of An Astonishing Invention Which Is Destined to Revolutionize the World's Fuel and Industrial Conditions.

By PIERRE H. BOGARDUS
(Of Illustrated World Staff)

NOTE.—This publication has refrained from accepting investment announcements in the past, and we feel that in submitting the article that follows we are breaking our unwritten rule for good and sufficient reasons. The character of the proposition; the high standing of the men behind it; the opinions of experts of international standing endorsing the proposition and its practical and commercial value; the opportunities it offers for profits are such that we believe we are fully justified in accepting this announcement. We have investigated and found that the facts, as far as we can learn, are as represented. We offer it therefore for the consideration of our readers.—EDITOR.

I HAVE seen OPPORTUNITY.

I have seen written in white hot characters on the isinglass of a roaring furnace the word FORTUNE.

I have seen that which will revolutionize industrial conditions in the whole world.

I have seen TESTED and TRIED, so that even a layman can read its meaning, an invention that, I believe, will make wealth for an army.

I have stood at the dawning of a great era and been dazzled by the enormity of what this has brought into my mind, the possibilities it has revealed.

So must have felt those who witnessed the first flutterings of the human voice over Alexander Graham Bell's first telephone, or seen the dull glow of Edison's first incandescent light, or heard the crackling sputter of a message conveyed on the air by wireless as Marconi first tested his invention, or the thrill that marked the first flight of Wright's air bird as he launched it to prove to the world that flying in heavier than air machines was a solved success.

For this invention is, in its potential possibilities, as great or greater than any of these, for it solves a problem that means hundreds of millions of dollars of economies to all the world's fuel users.

An Epochal Invention

I could not help thinking as I stood by this roaring furnace demonstrating a new principle in heating that here was just such an OPPORTUNITY as had been offered by Bell, Edison, Marconi, Wright, Westinghouse and other great world inventors when they sought to interest capital in their epochal inventions.

I could not help wondering whether this invention would have to go through the same soul-trying periods of development due to lack of public faith that marked the early struggles of all revolutionary departures from conventional things.

"If the world could only see this testing plant," I said to myself, "there could be but one answer—SUCCESS." No one can witness what I witnessed and remain indifferent. You may not have that advantage, so I will try and tell what is being done every day in a demonstration plant on the West Side of Chicago, where the Powdered Coal Engineering and Equipment Company has in operation the first furnace ever operated by the Pruden Coal Carburetor in existence.

Nearly everyone knows that coal which produces the heat that develops power moves the world of commerce and industry.

Fuel Supply Is Limited

Nearly everyone knows too that the world's available supply of the coal now in use for producing heat is growing less at such a fast pace that already the engineers and inventors are struggling with the eternal problem of what to do for power in the near future when the coal supply will become so scarce that it will go to prohibitive prices.

Most people know that one principal cause of the rapidly diminishing supply of coal is the terrific wastage of the supply, due to the crude methods of turning coal into heat.

Fuel experts say that sixty per cent of the heat producing value of coal goes up the stack in UNCONSUMED COAL in the form of smoke burdened with fine particles of coal, in cinders which are about seventy per cent unconsumed coal, and in unconsumed gases which, if properly burned, would produce heat and power.

The factory or office building smokestack, with its belching column of inky smoke, is wasting tons of fuel every day. The squat stack of the locomotive, with its black, trailing plume of smoke, is wasting tons of unconsumed coal every day. The high stack of the steamer raising its panoply of sooty smoke that lingers on the horizon is wasting tons of unconsumed coal every day.

The pall of sooty black smoke that hangs over the cities, contributed to by every office building, apartment building, home and industrial plant, is actually worth hundreds of thousands of dollars in unconsumed coal.

$500,000,000 Smoke Loss

The United States Government, which is not given to exaggerations in its statements, places the loss from this source at $500,000,000 a year.

Just think of it—FIVE HUNDRED MILLION DOLLARS wasted in the United States alone EVERY YEAR.

Are those not figures to stagger the imagination? Is that not an appalling consideration in this era of so-called efficiency?

And the Pruden Coal Carburetor can and WILL put a stop to this monumental wastage, for it solves the problem of COMPLETE CARBURIZATION OF ALL THE COAL THAT GOES INTO THE FURNACE.

Now do you BEGIN to see what this astounding invention means to the world?

But read on.

One Billion for Fuel

The fuel bill of the United States FOR POWER ALONE is nearly ONE BILLION DOLLARS A YEAR. Yes, that is spelled correctly, ONE BILLION dollars for coal to make the wheels of commerce and industry go round in THIS COUNTRY ALONE.

And this is for POWER only, not for heating.

The heating bill is not much less.

Do you wonder that the coal supply is running so short that experts say we may be practically without coal in fifty years?

Do you believe that ANY INVENTION WHICH WILL DOUBLE OR TRIPLE THE POWER-PRODUCING VALUE OF COAL OFFERS YOU AND ALL THE WORLD A WONDERFUL OPPORTUNITY?

It doesn't take a mathematician to figure it out.

Yet that is what the Pruden Process will do, AND IS DOING in this demonstration plant I am going to tell you more about.

Value of Powdered Coal

The possibility of burning powdered coal has been agitated for a great many years. There are records showing that it had been attempted over 100 years ago. As long ago that fuel experts believed that if it was ever possible to find some way to burn pulverized coal a much hotter, better and cheaper heat could be produced. With the facilities available, it was practically impossible to do this successfully, and periodical attempts, made at frequent intervals ever since, proved equally futile.

To undestand why powdered coal will, if properly burned, give more and better heat it is necessary to understand the principles of combustion.

Principles of Combustion

Combustion is produced by the combination of a substance with the oxygen in the air. Now, if you take a cubic inch of coal, that cubic inch of coal offers exactly SIX SQUARE INCHES of surface to the oxygen in the air. Only six square inches on which to effect that combination of the carbon in the coal with the oxygen in the air.

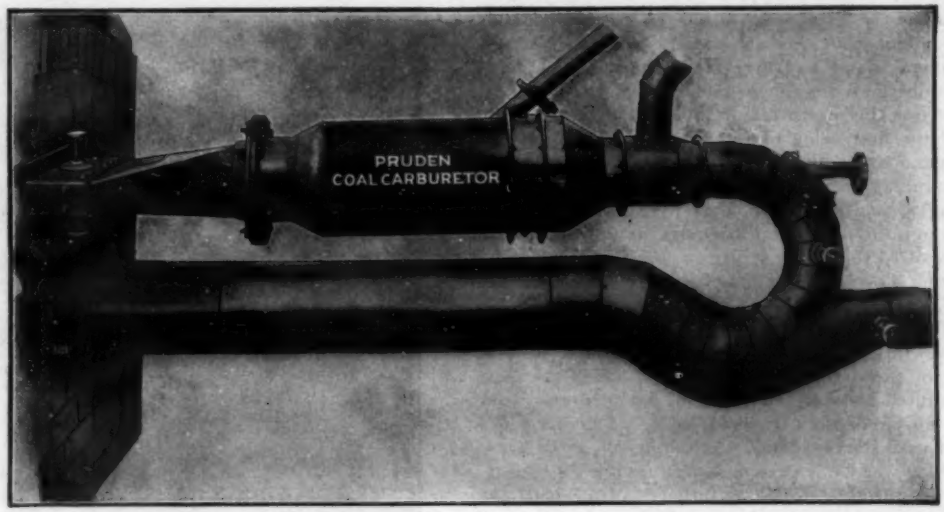
A cubic inch of coal reduced to powder offers from 20 to 25 SQUARE FEET of surface for combination with the oxygen in the air in the process of combustion or carburization.

Now do you begin to understand why powdered coal offers such advantages over lump coal?

About sixteen years ago Harry B. Pruden became interested in the problem of powdered coal.

Like many other men in business, he had learned of the fuel problem. One day he witnessed some experiments made in an attempt to burn powdered coal by projecting it into the firing chamber on a jet of steam.

He watched the experiment with deep interest. He soon saw that the steam destroyed the heating value of the coal by surrounding it with too much moisture.



THE PRUDEN POWDERED COAL CARBURETOR SHOWN IN DETAIL

Photograph of the Pruden Coal Carburetor as installed in the Chicago Demonstration plant now in successful operation. This is the KEY to the whole process of burning powdered coal by the Pruden process. In this carburetor the powdered coal and air are so mixed as to insure COMPLETE combustion of ALL THE COAL

It gave him an idea. Mr. Pruden was at that time a salesman. A born mechanic, finding his pleasure in experimental work of an inventive nature, devoting his leisure to a little work-shop where he tinkered at every available moment, he took to studying the principle on which gasoline is carburized to furnish motive power for automobiles.

Birth of a Big Idea

Like a good inventor, he studied the gasoline carburetor. He studied the principle back of it. He discovered that gasoline was made powerful by combining with it a required quantity of air.

Now, thought Mr. Pruden, if I inject powdered coal THOROUGHLY MIXED WITH AIR into my firing chamber, I can insure COMPLETE AND IMMEDIATE CARBURIZATION OF EVERY PARTICLE IN THE COAL.

So he started to work, inventing a method of mixing the coal dust and the air in proper proportions, a practical coal carburetor.

To develop a practical coal carburetor took years of study. Wherever Mr. Pruden's business took him, for he was a successful business man, there Mr. Pruden built a small laboratory for his experiments. Piece by piece, detail by detail, he worked out his plan. As soon as one detail was completed it was tested under all sorts of conditions. Scores of experiments proved failures, but each failure was a step nearer to success.

The problem of getting the coal in the right condition for the work was a serious one. Scores, perhaps hundreds, of experiments failed because the fact had not been revealed that in order to get perfect results the powdered coal must be absolutely dry. Coal absorbs moisture very easily. Then it was hard to get coal powdered finely enough to insure the best results. All this meant more experiments. At last coal, ground to the fineness of an almost impalpable dust, and dry of all moisture, was secured by Mr. Pruden and he tested it in his small temporary experimental carburetor.

Experiment a Success

The machine was set going, the firing chamber made ready by placing a handful of waste saturated with oil before the spout and igniting it, and then the coal was turned into the carburetor. Instantly the black flow caught fire from the burning waste and a three-foot flame poured out of the nozzle of the carburetor into the fire chamber. As the heat increased the flame lengthened, until the whole fire chamber was a roaring mass of flames, which gradually grew lighter in color until it was finally white with the white flame of terrific heat.

The Pruden Carburetor for firing powdered coal was a SUCCESS.

Immediately Mr. Pruden set about constructing a real demonstration plant. He started in designing it, and when it was completed he gave up his business connections and came to Chicago.

A factory site was secured and the first Powdered

Coal Power Plant was started. A complete installation was made, including a powdering and drying equipment and a reverberatory furnace, such as is used in the treatment of metals.

It was the first plant of PRACTICAL size built, and the first firing of it marked an event. A ton of mine waste, the tailings of the mines which has a value at the mine of 80 to 90 cents a ton, was bought; the first few pounds were dried, then run through the powdering machine, the powdered coal was sifted through a screen so fine that there were 200 meshes to the inch, and then fed into the hopper.

The machine was started; a handful of oil-soaked waste thrown in and ignited and the feed started. As the powdered coal flew into the firing chamber it ignited instantly and a jet of flame sprang from the nozzle of the carburetor as it had done on the first makeshift machine. As the fire chamber grew warmer, the flame grew in length until it was shooting all through the great furnace, as the isinglass windows, let into the side for observation purposes, indicated, and it was roaring into the chimney.

Burns Without Smoke

When the "window" in the chimney indicated that the flames had gone beyond the fire chamber, a rush was made to see what story the smokestack would tell.

All that the chimney showed to indicate that there was a fire in the furnace below was a pale vapor rising from it which was dissipated ten feet from the top of the stack.

Combustion was ABSOLUTELY COMPLETE; not an atom of unconsumed coal was going out of the stack.

Satisfied that his demonstrating installation was a success, Mr. Pruden set about organizing his company to promote his invention.

So far he had kept his plans pretty much to himself. He had used his own capital so far. He had blacked his own invention with his own money. He had taken all the risks. He had now a plant which would PROVE EVERY CLAIM HE MADE for his invention.

Mr. Pruden is, as I have already told you, a business man. He has seen other inventors stripped of the fruits of their brains by unscrupulous financial men. He has seen men of wealth make millions out of inventions, while the inventors either were stripped of everything or were forced to be satisfied with a paltry pittance.

Financing the Invention

With such an experimental plant in operation and the practical solution of a problem that meant hundreds of millions of dollars, he could have gone to the financial powers, shown what he had and secured all the money he wanted AT A PRICE.

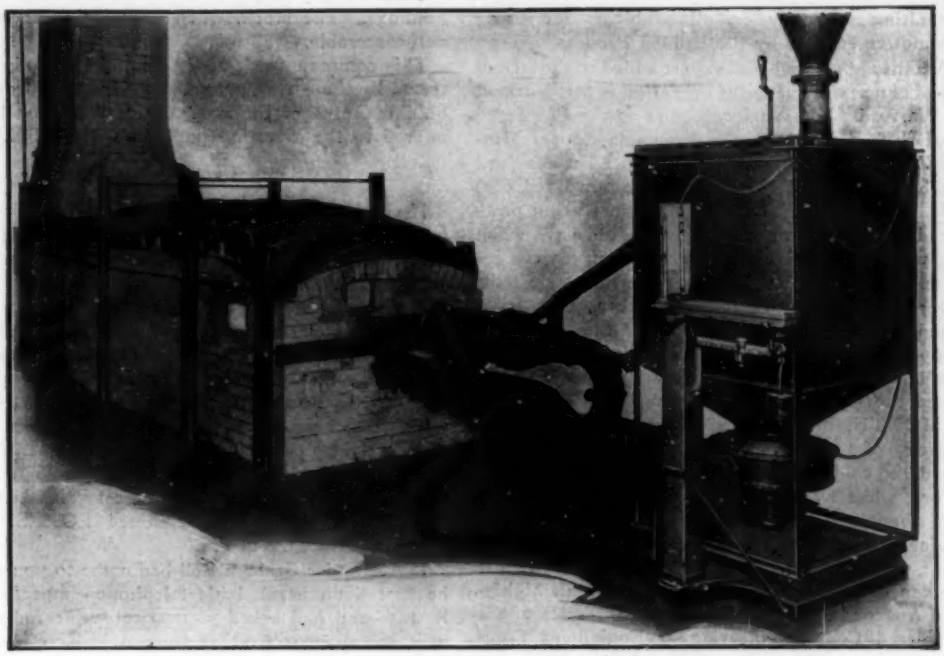
ALONZO G. KINYON

Mr. Kinyon was superintendent of locomotive power of the Seaboard Airline Railroad when he came to Chicago to investigate the Pruden invention for his road. He was so impressed he joined Mr. Pruden as consulting engineer.

THAT PRICE, Mr. Pruden decided, he WOULD NOT PAY, for the price, he knew, would be control of the company he had organized.

In casting about for financial support, he met Mr. P. M. Power, a banker, head of the firm of Power-Wall Company, industrial bankers in the Railway Exchange Building, Chicago, and a brilliant, aggressive and clean-cut type of business man.

He took Mr. Power to his experimental plant and showed him the furnace. He had it started and proved what he claimed. He showed Mr. Power that with 90 cent coal he was doing the work that double the amount of $3 coal could do. One ton of mine waste was producing the amount of heat that two tons of $3 coal would be required to produce under the old wasteful methods. He showed him the stack free of smoke, he showed him a furnace floor free of cinders, he showed him heat of tremendous intensity produced in the time it takes an ordinary furnace to get warmed up. He showed him the doing away entirely with stokers or firemen, with one man having plenty of leisure to look after half a dozen or more installations. He showed him in HARD FIGURES, such as a banker could understand, why the Pruden Process



PRUDEN PROCESS INSTALLATION AT DEMONSTRATION PLANT

Here is a photographic view of the Pruden installation at the company's demonstration plant in Chicago. At the right is the hopper, then the carburetor and then the furnace.

could cut at least $200,000,000 a year off the fuel bills of the United States.

He showed him the millions of tons of waste coal now often destroyed at many mines because useless as fuel. He showed him reports of BILLIONS OF TONS of low-grade lignite coals, which are NOT EVEN MINED—and which the Pruden Process will convert into good fuel.

And when he had finished telling his story, Mr. Power pulled out a fountain pen and a check book and wrote a check for $5,000, which he handed to Mr. Pruden to help him perfect his organization and go ahead with his plans.

Mr. Power then offered to help finance the company AT MR. PRUDEN'S OWN TERMS.

A Strong Organization

Mr. Pruden's first move was to surround himself with capable men. He knew that his own limited engineering experience and knowledge would require that he have men capable of handling the many problems that would present themselves in adapting the Pruden Process to the various conditions which would arise.

From the General Electric Company he secured Frederick W. Cunningham, a young engineer of great promise. Mr. Cunningham is a graduated electrical engineer from Princeton College; he is a bachelor of science of the same institution and took a course in practical commercial chemistry at Wisconsin University, which gave him the title of Ph. D. He had made an enviable record with the General Electric and became so enthusiastic over the prospects of Powdered Coal as a fuel by the Pruden process that he begged for a chance.

About that time Mr. Alonzo G. Kinyon, Superintendent of Locomotive Operation for the Seaboard Air Line R. R., arrived in Chicago to investigate the Pruden Process as to its applicability to railroad locomotives. Mr. Kinyon is one of the really big men in railroad fuel circles. It is said that his improvements and the economical methods he introduced in the Air Line saved that road half a million dollars a year on their fuel bill.

Gets Famous Fuel Expert

He asked for a demonstration of the Pruden Process, and, after watching it in all its aspects for several days, begged for a chance to ally himself with Mr. Pruden.

Mr. Kinyon's offer was accepted and he is now in charge of the demonstration plant and will be the

consulting authority on all problems for firing locomotive engines by the Pruden Process.

Another powdered coal expert added to the strong list of experts in charge of operation is Mr. Norman L. Warford. Mr. Warford comes to the Powdered Coal E. & E. Co. from the Anaconda Copper Mining Company of Anaconda, Montana. Mr. Warford has been one of the pioneers of the powdered coal field. He was one of the first to start using powdered coal in making cement in the old days when the powdered coal and the cement clay were injected into the rotary burners for firing. He built several cement plants and his success with powdered coal won him a place with the Anaconda Copper Mining Company. His introduction of powdered coal in the smelting of copper ores reduced the fuel bills of that company over $25,000 A MONTH, it is claimed. This company has a capacity of 1,000 tons a day. He made one ton of powdered coal melt SIX AND ONE-HALF TONS of ore, while by old firing methods FOUR TONS was about all they could do. Mr. Warford was engineer in charge of the powdered coal department of this great company. His interest in the Pruden Processes caused him to give up his highly-paid Anaconda position to push the interests of the Powdered Coal Engineering & Equipment Company.

Having now considered the product—the Pruden Carburetor and Process for burning Powdered Coal—and the men associated with Mr. Pruden in his undertakings, it is worth considering the possibilities of the company as an investment, for it is an investment that YOU should consider this company.

As I already told you, Mr. Pruden refuses ABSOLUTELY to turn over the control of his company to any financier or group of financiers.

Opportunity for Investment

To secure the necessary funds for developing the company, equipping a larger plant, building installations of all kinds and extending the sphere of the company to all parts of the world, Mr. Pruden and his associates of the Powdered Coal Engineering and Equipment Company have entrusted the Power-Wall Company to sell the necessary amount of stock in the company, with the provision and agreement that in no case will subscriptions be accepted for more than 500 shares.

The Powdered Coal Engineering and Equipment Company is capitalized for $3,000,000—**all common stock, fully paid and non-assessable, which shares equally in all dividends and earnings of the company.**

The company is incorporated under the laws of Delaware, which relieve all stockholders of any liabilities over and above the par value of their holdings. The stock, when paid for, is therefore non-assessable.

This common stock of the company is fully protected by the assets, patents, installations, property holdings, etc., of the company, and is now being offered to the investing public AT $12 a SHARE.

Some Startling Facts

If you have not been sufficiently interested so far in the enormous possibilities of the stock of this company as an investment, a few FACTS may be brought out that will interest you.

Everyone knows what enormous fortunes have been made by the holders of some of the stocks of companies that have had phenomenal growths. One thing that you may not have thought about, however, is the fact that nearly all the great gains in value and phenomenal dividends have been paid by industries developing FUNDAMENTAL necessities of life.

Those who have made the biggest gains in these stocks were those who combined FORESIGHT with OPPORTUNITY.

If Alexander Graham Bell had come to you when he first demonstrated his telephone—imperfect as it was—and had asked you to subscribe for stock in it, the chances are that you would have laughed at him. And if he had succeeded in convincing you that you really and truly were turning down a solid opportunity for large profits from your investment you doubtless would have been skeptical and would have tried to get off by investing JUST AS LITTLE AS POSSIBLE.

What Others Have Earned

The same might be said of Edison, of Westinghouse, of Welsbach, of Burroughs, of Mergenthaler, of Dunlap, of Ford, and goodness only knows how many of the others whose inventions have made fortunes. Just to give you an idea what even a small investment in any of the stocks of these concerns would have earned, here is a list from Moody's Manual, an authoritative source, showing what $100 invested in any of the few leading FUNDAMENTAL companies would have brought in:

Bell Telephone	**$54,000.00**
Western Union Telegraph	**15,000.00**
Jenney Coupler	**18,680.00**
Welsbach Gas Mantle	**50,000.00**
American Radiator Co	**49,000.00**
DeLong Hook and Eye Co	**10,000.00**
Burroughs Adding Machine	**41,340.00**
National Cash Register Co	**42,870.00**
Underwood Typewriter Co	**38,385.00**
Dunlop Rubber Tire Co	**25,000.00**
Mergenthaler Linotype Co	**25,000.00**
Westinghouse Airbrake Co	**47,836.00**

It is reported that every $1,000.00 invested in the

NORMAN L. WARFORD

Mr. Warford was engineer in charge of the powdered coal department of the Anaconda Copper Mining Company of Anaconda, Montana, where he had effected economies by the introduction of powdered coal firing that are said to have saved the company $25,000 a month. Mr. Warford is a national authority on this subject.

original Ford Motor Company has paid $3,000,000.00. The estimate sounds impossible, but the facts are pretty well known that Ford started with a cash capital of $28,000.00, which has grown in twelve years into a company having assets rated around $88,000,000.00, with a well authenticated report that Ford refused an actual offer of $200,000,000 for his plant, business and good will. You can figure it out for yourself what an original $100 investment in the Ford Motor Company stock would have grown to had Mr. Ford accepted this offer of $200,000,000.00.

And you must remember that all these companies, including the Ford company, had an enormous amount of educational work to do in establishing the DEMAND for their product.

THIS IS UNNESSARY IN THE CASE OF THE PRUDEN PROCESS, for which a READY DEMAND exists, and has existed ever since coal was first used as a fuel.

In fact, there are on file in Mr. Pruden's safe scores of letters asking about the success of his work and HOW SOON he will be in a position to install his process for using powdered coal.

Possibilities of This Company

To give an idea of the possibilities of this company

There are approximately 300,000 industrial concerns in this country that need it.

There are in active operation in the United States alone 65,000 railroad locomotives that need it.

There are tens of thousands of large buildings operating their own heat and power plants that need it.

There are thousands of mines of all kinds in various parts of the country that need it.

There are scores of steamships that need it.

There are thousands of water and light plants that need it.

There are enormous metal working plants all the country over that need it.

And all those who realize that a Pruden installation would mean a saving of 20 to 40 per cent of their fuel bills would be willing to pay well to have one installed.

Is it to be wondered at that everyone connected with the Powdered Coal Engineering and Equipment Company is chock full of such convincing enthusiasm that to talk to any member of the company is to feel a shock of anticipatory excitement thrilling through every fiber?

And these are cold, scientific, level-headed men who are not given to enthusiasm. They are men who compute in hard figures and count their results in decimals.

Men of Broad Vision

Theirs is not the enthusiasm of the hot-headed carried away by the spur of a suddenly enlightened imagination. They are clear-eyed business men with VISION.

It takes VISION to compute the possibilities of any great enterprise.

The genius who stretched twin threads of steel across the great Western prairies had VISION. He foresaw the endless chain of trains rushing across these vast wastes of land, bringing civilization, humanity, ingenuity and courage to develop the dormant possibilities of this great continent beyond the Father of Waters.

Bell saw the furthest ends of the earth drawn together over a slender wire of copper, with people talking across space as easily as you talk to a friend across the dinner table.

Marconi saw his messages carried through the air in the twinkling of an eye.

Edison saw his incandescent electric lamps lighting the farthermost portions of the outer darkness and twinkling in millions of homes and offices and factories, turning darkness into light.

Watt may have seen in his sputtering tea kettle's steam the palatial steamers and crashing trains that

have brought near to each other the peoples of the remote spaces and have populated the deserts.

Sees a Smokeless City

I am not imaginative, but my minds' eye conjured visions of beautiful white cities glistening in the sunlight without a wisp of smoke to rob the air of its purity or to defile them with filthy smoke laden with coal, soot and cinders. I saw billions of tons of the low grade lignite coals adding to the world's fuel supply. I saw the cost of power of this great nation and all the nations of the earth reduced by half. I saw the millions of tons of mine waste, now being thrown on the dump heaps, turned into heat and power to drive the wheels of commerce and industry. I saw men freed of the slavery of the stoke holes of the great ships.

I saw the cost of producing of power reduced so low that not even water power could be produced as cheaply. I saw living costs reduced everywhere. And I saw the most criminal waste in the world today remedied by the invention of this quiet, efficient man of brains.

A Talk with Mr. Pruden

I talked to Mr. Pruden. I expected to find the usual inventor. I found instead a cool, keen-eyed and wide-awake business man. I had expected the heroics one somehow connects with men who do big things. I found instead a resolute, self-contained and thoroughly practical man. He told me his story, much as I have told it to you already. He told me how as a boy his playthings had been mechanical toys, how he began to spend his leisure hours working out mechanical problems.

He told me that he knew he could make money working, more than he could make for a long time on anything he might invent, so he went to work. He sold goods on the road. He sold automobiles. He was the manager of automobile distributing offices. He organized and developed a big automobile sales agency. But in spite of his success his heart was not in the work he was doing so well. His heart was in his little shop where he spent all the time that his business did not require.

He told me of his first interest in powdered coal problems sixteen or more years ago and how he first conceived the idea of a practical coal carburetor. He told me how he developed this and the difficulties he encountered. He told me of those early struggles to complete his invention to its present practical usefulness. And he told me how he had struggled and denied himself all luxuries so that he could put every surplus dollar he could spare into this work which was to be his life achievement.

A Heartbreaking Struggle

He told me how people had laughed at his plans and how big men who would now like mighty well to have listened to him turned deaf ears to his pleas when he was still struggling and needed capital. And he told me how he had made his resolve then to give no financier or set of financiers a chance to take from him his life work by those methods so well known to those familiar with the financiering of inventions.

And when I asked him to summarize for me the salient points of the value of his invention, he told me:

Today great economic problems are all solved scientifically.

"The shortage of coal and oil is actual or will be very soon. The world's supply of these fuels is limited. Discoveries are growing less every day.

"The question then is to discover NEW ECONOMIES.

"It is better to SAVE ONE-FOURTH OF THE FUEL than it is to discover one-fourth more supplies.

"Ever since steam has been employed as power, SMOKE has been preaching its sermon of WARNINGS AGAINST WASTE.

"Smoke is UNCONSUMED FUEL.

"The old methods of firing are WASTEFUL METHODS.

"The fuel in the firebox was only PARTLY CONSUMED. The balance was swept out, and is being swept out, through the flues and chimneys' UNCONSUMED.

"Most of the VOLATILE GASES were not liberated from the coal until they had reached the front end of the firebox, then it was TOO LATE for them to burn. MORE WASTE.

"The draft necessary to burn SOME OF THE COAL was always sufficient to carry the balance of it out of the stack, and this WAS EQUALLY TRUE ABOUT PETROLEUM.

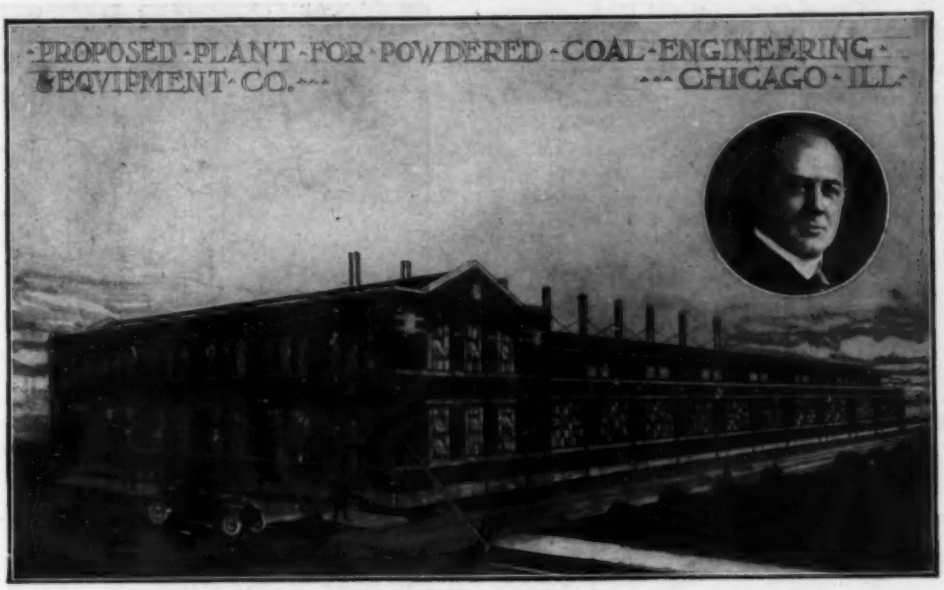
"To gain SOME HEAT consumers of power fuel have been THROWING AWAY BILLIONS in the form of waste—dissipating valuable fuel—JUST AS VALUABLE AS THE FUEL CONSUMED—adding to the smoke nuisance and depriving themselves of POWER.

"To gain ONE HORSEPOWER many plants are WASTING TWO HORSEPOWER through the methods of firing because there was NO BETTER METHOD.

"True progress in industrial life comes from true economy. It is basic foundation of efficiency.

"The Pruden process will save the United States $200,000,000 a year or MORE as power needs expand.

"The American business man is the livest wire in the world. He appreciates true economy at its



THE NEW PLANT OF THE POWDERED COAL COMPANY

This is the architect's drawing of the new plant of the Powdered Coal Engineering & Equipment Company. Here will be built the installations for all purposes to which this great invention is applicable. The inset picture is of Mr. Harry B. Pruden, inventor of the Pruden Coal Carburetor and of the powdered coal process described in this article.

true value. Will he spend TEN PER CENT. to save $200,000,000 that is now wanton waste? I think so, don't you?

"I believe that this process will revolutionize industrial conditions in the United States. If you could see the mass of data, letters, inquiries from big industrial enterprises, railroads, scientific journals and trade papers that I have received, you would begin to understand why I feel so coldly confident in the future of this process. I have been through my periods of exaltation, of enthusiasm, of brain whirl. Today the enormous realities have filled me with cold conviction of our inevitable success.

"It is only a question of HOW SOON we can get started. That depends on how soon we are provided with the necessary capital to go ahead with our work.

"Once we are in position to accept orders on a large scale, our problem will be NOT TO CREATE a MARKET, as is ordinarily the case, but to FILL ORDERS.

"We have convincing evidence that our business growth will be measured solely by our plant capacity. ADEQUATE PLANT CAPACITY is therefore our chief problem and the answer to this problem is in this issue of stock which we are now offering through Messrs. Power-Wall Company."

Fuel Men Impressed

A significant indication that Mr. Pruden's statements are coldly conservative is given by the result of last spring's convention of the International Railway Fuel Association, which met in Chicago May 17 to 20 at the La Salle Hotel.

The convention had hardly come to order before it became evident that it was going to resolve itself into a Powdered Coal Convention. No other subject was considered the first day and finally the entire convention adjourned to the demonstration plant of the Powdered Coal Engineering and Equipment Company, where Mr. Kinyon proceeded to make a demonstration that opened the eyes of the fuel experts present.

A report of the convention published in one of the scientific papers makes the enormous interest of this problem clear to all who read.

Today every railroad in the country is considering this problem and it is more than probable that the first orders the company will have to fill will be to equip railroad locomotives with Pruden installations.

It is a matter of record that the roads centering in Chicago are paying $65,000 a year in salaries to smoke inspectors to keep down the smoke nuisance, and with mighty small results.

An installation of one Pruden equipment on one locomotive will inevitably show such enormous economies that it won't be long before the railroad will have to equip the whole locomotive force of the road with the appliances. And one installation in any industrial center will sell many more as soon as it proves its value, and that will be as soon as it has run long enough to demonstrate its great economy of operation.

Enormous Earning Power

As to the earning possibilities of the Powdered Coal Engineering and Equipment Company, these loom so large that even enthusiastic estimates pale into insignificance compared to the actual figures.

The conservative basis on which it is planned to operate, the modest estimates of expenditures outlined, the economic character of the work to be done and the class of the men who will be in control of the active management of the company all insure the largest results from the smallest possible amount of money actually put into the development of the company.

The company is only seeking to raise $500,000. This is a small sum when the results anticipated from this investment are considered. It must be remembered that ALL THE EXPERIMENTAL WORK HAS BEEN DONE. All the heavy burden of preliminary investigation, experimenting, building of experimental machines, making of patterns and laborious work necessary to perfecting the invention has all been carried by Mr. Pruden and paid for out of his own resources.

He goes to YOU with a perfected, tested and PROVED invention that is past the experimental stage.

He goes to YOU with an IMMEDIATE MARKET waiting eagerly for his product.

He offers YOU the opportunity to invest NOW before the company is ready to sell its product and gives you the opportunity to get at $12 a share stock that should inside of a year be worth much more.

He offers you a FUNDAMENTAL NECESSITY of life. And a patented and protected process that will grow more valuable EVERY DAY it serves the public because every day will see its growth spread and its opportunities increase.

He offers you a chance NOW to get at $12 a share stock that in a year you probably will not be able to buy for many times that. And he goes to you frankly and honestly without reservations, telling you just what he has to offer and just what the chances are for its success.

FRED W. CUNNINGHAM

This brilliant young engineer left the General Electric to take up the engineering problems of the Pruden Powdered Coal processes. He will aid in the solving of fuel problems for the company.

An Honest Statement

So absolutely square and honest is Mr. Pruden, and are the men associated with him, that none would predict the possibility of immediate dividends. No promise of dividends within an unreasonable period is made. It would not be the part of good management to deprive an enterprise of this magnitude of necessary capital during its youth in order to soothe or satisfy a short-sighted stockholder.

This company is a BUSINESS, not a lottery. It is not organized for the purpose of stock manipulation. If it had been it would have been in the hands of the financial interests long ago. It is an enterprise that for magnificent prospects has probably never been equalled. It is by no means unlikely that substantial dividends may be earned within the first twelve months, but the growth this would indicate would also necessitate plant enlargements and increased facilities for production which would in all probability prevent a dividend being paid. But this would be to the advantage of every stockholder whose stock in the company would become more valuable.

VISITORS AT THE CARROLL AVENUE DEMONSTRATION PLANT

Every day almost the demonstration plant in Chicago is crowded with men and women interested in this wonderful new invention. Here they will see practical demonstrations of the value of this invention.

A Stock for Investment

This should be a stock for investment, not merely for speculation. Its dividends, great as they ought to be, will be only a small part of the value this stock should represent to you in its continued enhancement in value.

Owing to the character of the installations very little money will be tied up in manufactured stock, as in most businesses. Here nearly every installation will have to be made to order to fit special requirements. It will be largely an engineering problem asking for different solutions and individual requirements. There will be no "over-production" with resultant losses. Whatever the company produces will be ON ORDERS and will be paid for under contract.

The company proposes as far as is consistent with the satisfactory handling of the business to make provisions for increased output out of the earnings of the company, thus "turning over" the original working capital and making it do its utmost in earning power. This will make every share of the Treasury Stock now being offered increasingly valuable.

This stock offering amounts to less than 25 per cent. of the authorized capital and the company is anxious not to have to offer any more treasury stock after the present issue has been subscribed. In other words, the company plans to keep the business as far as possible a "close corporation," a "family affair," as it were, confined to ownership among the original stockholders whose faith and investments of money at this early period in the life of the company will have provided the necessary capital to put the company on a substantial basis.

It is such a policy which makes fortunes for its stockholders.

All Profit-Sharing Stock

The fact that all the stock is Common Stock, sharing equally in all profits and carrying with it voting rights, giving each stockholder a voice in the affairs of the company, and making stockholders the actual owners of the business with the power to attend all stockholders' meetings, enjoying ALL profits without any preferred stock dividends to pay first out of the earnings, makes this an unusually attractive proposition.

The Power-Wall Company, acting as underwriters of the $500,000 worth of the treasury stock of the company now offered for sale, is a banking firm of the highest repute. It is composed of clean,

aggressive, enterprising men of sound business judgment and mature experience. They are not only pinning their good faith and reputation to the proposition, but are investing their time, money and efforts in the development of this enterprise, which they endorse without qualifications.

Before accepting the responsibility of marketing this stock they went into a most careful and exhaustive investigation of the possibilities, practicability and soundness of the invention. The best experts were consulted, the most complete tests were made, the market for the product of the company was ascertained. Although members of the firm had made investments in the company they would not undertake to place it before the public without first putting aside all questions of doubt as to its real merit. After all their investigations they were ready to go behind the Powdered Coal Engineering and Equipment Company with all their resources and influence. They left NOTHING TO CHANCE before making a public appeal.

Important to Investors

All this is very important to the prospective investor who rarely has the time or money necessary to look up an investment as thoroughly as it should be investigated.

The mere fact that this big banking house is backing this issue with its reputation is convincing proof of its merit.

The question in your mind should not be whether you can afford to invest your money in this stock but HOW MUCH can you afford to invest. If you have the means you simply CAN NOT AFFORD NOT TO TAKE AS MUCH AS YOUR MEANS WILL PERMIT.

It is said that OPPORTUNITY knocks once at everyone's door. To overlook the OPPORTUNITY that is hammering NOW at your door is to face a life disappointment.

To invest NOW is to qualify for ALL the profits that will come from this investment. To wait until the development of the company increases the value of its stock is to lose the chance of great gains, and probably any chance at all to become a stockholder in a company whose name is going to be written very large in the history of American—nay, of world industries.

Where You Stand NOW

You stand in the position TODAY of the man who years ago had been offered a chance to invest in Bell Telephone stock, Edison stock, Westinghouse stock, Ford stock, or the stock of any of the phenomenally successful companies that have made millionaires of their original investors.

Doubtless thousands of people who were offered such an OPPORTUNITY as you have today refused to heed the call of OPPORTUNITY and lived to regret their lack of foresight or their lack of courage to invest. Later when the companies were developed and the stock they had been offered at a low price jumped to incredible heights they saw others reap the reward they might have garnered. IT WAS TOO LATE THEN. FORTUNE, OPPORTUNITY, had knocked at their doors to deaf ears.

This is an opportunity where an investment of a few hundred dollars can make a man independent for life, fill his old age with the comforts every man and woman craves, build a rampart against want and privation in the declining days of life.

Invest for Safety Only

A man can not be too careful how he invests his money. But he should invest where the utmost of safety and the greatest possibilities of gain are offered.

A company like the Powdered Coal Engineering and Equipment Company, with its unequaled outlook, its guaranteed market, its PROVED SUCCESS, its wonderful field, its safety due to the fact that it fills one of the great economical needs of the whole world, offers the maximum of both these requisites.

To invest NOW is to be foresighted. Not to invest is to miss an opportunity that will never be repeated.

There is an old adage about an ounce of prevention being better than a pound of cure. It might be paraphrased "an ounce of foresight is worth a ton of hindsight."

Foresight makes millionaires.

You'll find plenty of men with hindsight in the bread line.

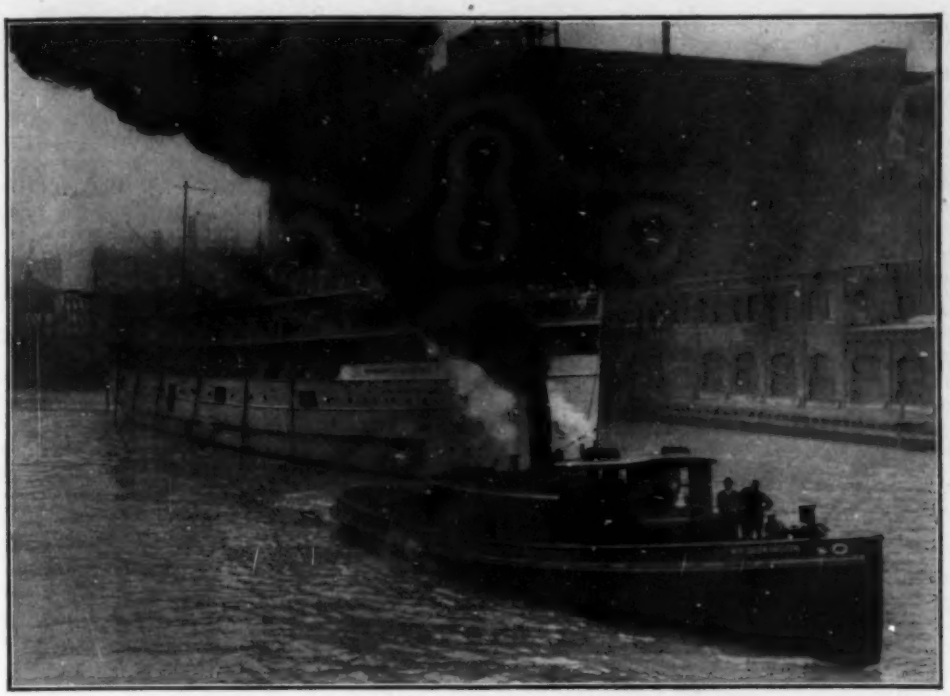
Which do you select?

A Solid Investment

As investments go, there is a character to this stock now offered you that words cannot quite describe. It is the strength of a WORLD NECESSITY made practical. It is the honest merit of a cleanly built, honestly planned and honestly managed company, organized for honest purposes and not for exploitation or speculation.

The Powdered Coal Engineering and Equipment Company is clean and straight from foundation to cap-sheaf. It offers opportunities for enormous earnings such as few companies have ever offered. It is honestly and capably officered and the men who are in charge of its actual operation are practical and competent.

Whether you accept this opportunity to invest in



WASTE COAL POURING FROM STACKS OF TUG AND STEAMER

This is all waste coal which the Pruden Coal Carburetor and process for burning powdered coal will save. It saves coal and it saves the damage from smoke.

the company's stock or not will not alter its eventual chances for success; it is going to succeed if human ingenuity, courage and skill, coupled with a world important invention, can win success.

It is a question of whether YOU want to share in the success of this great company.

It is a question of whether YOU want to share in what promises to be enormous earnings.

It is a question of whether you will accept this offer NOW or live to regret your failure to grasp OPPORTUNITY when it came to your door and offered you this wonderful chance.

A Splendid Opportunity

If you have the money you can't afford not to take as much of this stock as your means will permit. Don't live to say, like those who refused Bell, Edison, Ford, Dunlap, Welsbach and others whose names are world famous, that if their foresight had been as good as their hindsight they might now be comfortably well off.

Money in savings where it pays a small interest never made anyone rich until it was invested. A few hundred dollars invested RIGHT have lifted many a man from obscure poverty to wealth, from struggling and privation to ease and luxury.

Courage and Opportunity

Fear is the WORM that eats the heart out of courage. No man or woman who lets FEAR and DOUBT sit at the helm of life will ever be anything but a groveling WISHER, always wishing for something BIG to turn up, yet when the chance does come never having the COURAGE to grasp that chance.

Attached is an application blank. Sign it NOW. If you are as eager for this investment as you should be, SEND your check, bank draft or money order for the stock you want. It is now $12 a share. You can accept it with the condition that if after 15 days' investigation you are not satisfied for any reason whatever you can have your money back on return of the stock. If you can't pay all down, pay $2.00 on each share of stock you want

and the company will arrange for you to pay the balance in installments.

BUT DO IT NOW! Tomorrow you may not have the chance.

Stock to Advance in Price

Since the original announcement of this issue of the stock of the Powdered Coal Engineering and Equipment Company there has been such a big demand for it as an investment that the issue has been nearly subscribed. After March 15th the price of this stock will probably advance to $15 a share instead of $12, its present price. Had you bought from the first announcement you would already have had a profit of $2.00 per share. This advance in price is caused by the growing value of this stock which is becoming more valuable every day with the development of the company's plans.

Do not delay accepting this offer. Make a reservation NOW, if you are in doubt, then investigate all you want. Write to any bank, rating agency, etc., and get a report on the company, on Mr. Pruden, on the banking firm handling this issue of stock, and if you are not satisfied the Power-Wall Company will refund your money without hesitation.

If you reserve your stock now you will be protected against the next advance in the price of this stock.

A Statement by the Power-Wall Co.

Before accepting this issue of stock for public sale we made the most thorough and painstaking investigation of the process, the company, its management and its prospects. Experts were consulted, the legality of the issue was determined, the reputations of the men behind the company were scrutinized. WE NOW ENDORSE IT WITHOUT QUALIFICATIONS. We believe it is a SAFE, SOUND AND SPLENDID INVESTMENT, capable of earning surprising returns, and gladly court the most exacting scrutiny of the stock, the company, the product, the prospects. In order to give prospective investors every opportunity to buy at the present low price we are accepting reservations accompanied by $2 on every share desired and will hold this for 15 days subject to your wishes. If, after investigating, you are not satisfied, we will return your money. We advise early action because March 15th the present price offer of $12 a share may expire. March 15th the price of this stock will probably be $15 a share and it will doubtless go higher very soon.

THE POWER-WALL CO.

FILL OUT AND MAIL THIS COUPON NOW

THE POWER-WALL CO., Industrial Bankers,

525 to 550 Railway Exchange Building, Chicago, Ill.

Gentlemen:—I wish to subscribe for.....shares of the POWDERED COAL ENGINEERING & EQUIPMENT COMPANY, owners of the Pruden patents for firing powdered coal, at $12.00 per share—par $10.00—fully paid and non-assessable. I enclose herewith my remittance for $..... in part full payment of same. I do this with the understanding that if I am dissatisfied for any reason I will return this stock in 15 days and you are to refund my money. Please send me full particulars.

(NAME) .....

(ADDRESS) .....

(P. O.) .....(STATE) .....

NOTE—Should you be unable to pay cash for all the stock you wish, send $2.00 on each share with your reservation and you can pay the balance in 5 equal monthly payments of $2.00 for each share you want, which gives you six months' time.